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Integration of Family Planning and Health Services: The Narangwal Experience

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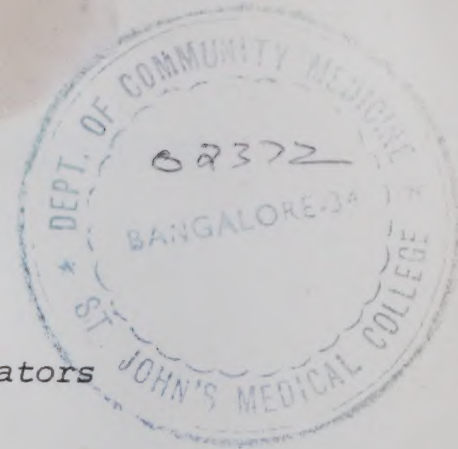
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PREFACE

Narangwal has come to mean more than the name of a village in the Punjab. It represents a new kind of field research - a pioneering of new approaches to old problems of village health. The Narangwal projects have explored new frontiers in defining the potentials of primary health care focussed on the needs of the poor and deprived people of the world.

The primary health care movement around the world received tremendous impetus from the WHO/UNICEF World Conference at Alma Ata in the U.S.S.R. Conceptualization of basic health services combined with new approaches to promoting community participation and intersectoral development presents a new range of challenges for health services research. The policy commitments that have been made now depend for implementation on better understanding of the dynamics of interactions between health and development. Programs of primary health care will demand greater political will and administrative persistence by national health services and international agencies.

The Narangwal research produced the most definitive evidence now available on a central theme of primary health care, the need for integrating services at the periphery. The Narangwal experience showed how auxiliary-based health care can be provided with less than \$2 per capita per year. Research methodology was adapted and developed in a

field research design that demonstrated the great potential of prospective and controlled field trials involving total village populations. By carefully measuring service inputs as well as outputs in utilization and outcomes in improved health and family planning, it was possible to calculate the total impact as well as relative cost/effectiveness of alternative interventions. These data should help guide the decisions of national health planners as they make judgements about probable costs and benefits. Our experience indicates, however, that simplified field trials will be needed in each new area to adapt what was learned at Narangwal to local conditions.

From the beginning of the Narangwal studies, Ministry of Health officials and the research workers agreed that the next stage would be to have multiple demonstration projects to apply Narangwal methods and findings to local conditions. Several such demonstration projects have been eminently successful in the five years since the Narangwal field work was terminated. Special contributions have been made in demonstrating the potentials of community participation and how the health team can help people solve their own health problems. As the national program of training community health workers evolves in India there will be need for continuing stimulus from demonstration and research projects. More focussed implementation is needed if an integrated package of primary health care, family planning and nutrition serving as an entering wedge in efforts to improve the quality of life of the rural poor. Narangwal research findings form an important base that will support this continuing effort.

In expressing appreciation to those who made the Narangwal Population Project possible it is necessary first to recognize a long and distinguished sequence of Indian government officials. The original decisions to undertake the research were made by the Ministry of Health and the Indian Council of Medical Research. At the personal level, the greatest credit for sponsoring the research and bringing it to fruition must go to the Directors-General of the Indian Council of Medical Research. It was started under Professor Wahi, continued under Dr. Gopalan and was especially facilitated by Professor Ramalingaswami. With their colleagues in ICMR they provided a profound depth of intellectual and administrative support and understanding that went far beyond official requirements as they served as the main point of contact and liaison for the research team.

Numerous officials of the Ministry of Health gave crucial support in times of uncertainty. Through the Narangwal conferences leaders in Central and State governments and in academic institutions provided crucial insights in what should and could be done and in interpretation of research findings. Special mention must be made of officials in the Punjab Health Services including the health secretaries, directors of health services, state officials in Chandigarh and district officials in Ludhiana who helped in many ways ranging from selection of study areas, and deputing staff, to prolonged discussions of how the research could be made relevant. Many colleagues in academic and research institutions participated in the field research and this applied especially to faculty from the Ludhiana Christian Medical College, All India Institute of Medical Sciences and the Chandigarh Post Graduate Institute.

We also thank the various agencies that have supported the research. We received much needed financial support at a critical stage from ICMR. Within AID the decision to fund the field work was made by the Asia Bureau and subsequently we received support for analysis from the office of Program Planning and Coordination. At crucial times we received grants from WHO's special program for human reproduction research and from the Merrill Fund. The NIH provided assistance for analysis. Finally, the crucial final stage of analysis that led to this book has been from the research division of the World Bank, with special appreciation for the roles of Timothy King and Ravi Gulhati.

Those of us who have had the privilege of producing this analysis and report have felt a particular burden of responsibility to our colleague who shared the field work. Just listing their names with designation of their roles scarcely gives adequate recognition for the intense pride and highly capable effort that made the field experience so productive. All who were part of the Narangwal family know that life brings few opportunities to work with as congenial and dedicated a group of involvement in colleagues. The list of staff gives a sense of the magnitude of involvement in the project of a large number of researchers and field staff over the life of the project. Starting with no more than 15-20, the number of staff grew to about 150 by the end of the project (Staff from six other countries besides India averaged two at any point during the project.) The ties of collaboration grew very strong among these field staff who shared the excitement of living and working together in the villages. As individuals moved on to new positions during or after the project they have carried an important and deep imprint of

this experience.

Finally, our deepest thanks go to our wonderful village hosts. whose hospitality made us feel that these villages were truly our home. We often identified so completely with their concerns and joys that we used to worry about maintaining scientific objectivity; however, since community participation requires seeing things through the eyes of local people this became a positive contribution. With patience and goodwill they welcomed our research activities. Their understanding of the rationale for the research design led to genuine pleasure that lessons learned in this work might help village programs in India and the world. It is to our village friends that we express our deepest gratitude in the shared hope that this report may help improve the quality of life of the world's most needy people.

POP MONOGRAPH

CHAPTER 1

STUDY BACKGROUND AND DESIGN

Carl E. Taylor

General Policy Consideration

Policy makers and planners in developing countries and international agencies need more substantive information on the interacting variables that influence family planning. Most countries have decided to integrate health and family planning services for largely political reasons. Therefore, the major policy issue is no longer whether to integrate but what, when, and how. Decisions are made about program directions and resource allocations without much understanding of the likely impact of alternative options on the dynamics of the interactions between health and population variables. The Narangwal Population Project provides quantitative information to guide decisions about how primary health care and family planning services can be designed to reach underserved village people.

In a controlled research design comparative tests measured the impact of various service packages combining family planning and maternal and child care. Significant benefits were achieved in effectiveness, efficiency and equity. Relative effectiveness was demonstrated by the increased impact on family planning and fertility of combinations of curative and preventive health services for women and for children. Efficiency also

improved with integrated services showing two to three times greater cost/effectiveness in promoting family planning as compared with single services while also achieving significant health benefits. Considerable equity was achieved in reducing the usual disparities according to socioeconomic level in distribution of services for both family planning and health. Lower caste groups whose acceptance of family planning had been significantly less than upper castes prior to the project increased their rate of acceptance to the level of the upper castes. The principle mechanisms used to improve equity were focussed surveillance and the use of entry points to introduce family planning into routine maternal and child care.

These findings fit well with current understanding of the potential interactions between social development and fertility decline. For sustained progress toward achieving a balance between mortality and fertility there is growing evidence that equitable distribution of basic social benefits must reach the poorest people (Grant 1978). In any definition of minimum human needs a combined package of health, nutrition and family planning has obvious priority along with general education and activities to improve the status of women. For long range social development to be effective, parallel economic growth is also needed. During this research in the Punjab, we were fortunate in being surrounded by rapid economic development and social change. That the results could not be attributed to the socioeconomic change alone is indicated by the lack of change in control groups.

Throughout this report, it will be apparent that we were frankly

interventionist in our approach. The research was conducted to find the most direct and culturally acceptable ways of promoting family planning rather than waiting for social and economic forces to reduce birth rates spontaneously over time. The separation of effects due to social and programmatic factors that go beyond the simple provision of family planning services requires a complex analysis of multiple factors.

Two groups of variables have been identified. Many of the factors which are strongly associated with fertility decline, and have therefore been most intensively studied, cannot be changed. Either they are endogenous, such as caste, or they are the resultants of relatively slow moving social trends, such as the status of women and son preferences. Education and communication between husband and wives proved especially important. Understanding such factors is useful for policy makers and program managers mainly because they help in identifying target groups for special services. Our results include data on these variables and show how they can be used to focus service efforts.

The second group of variables are the relatively few which are manipulable through program interventions. The most readily manipulated set of variables is integration of various health services with family planning. Surprisingly, this area has received almost no systematic research attention. The Narangwal research not only measured the strength of associations between various combinations of services but it also demonstrated how these could be implemented. All services were designed to be implementable in normal government services using auxiliaries and at total service costs below \$2 per capita per year.

General Objectives

The research has had two goals. For general international and scientific interest there were a complex set of research hypotheses and models which were tested in a controlled experimental design. Different service packages were inputs leading to quantification of input-output-outcome relationships.

For the pragmatic program development needs of India and other developing countries the parallel goal was to evolve low cost packages of integrated services for rural areas which could then be adapted in demonstration projects to the specific needs of government services in the various states. The Government of India's major objective in promoting this research was to find out how to develop an integrated pattern of services combining family planning, women's services, child care and nutrition. Ministry of Health officials had already decided that they needed to go beyond the intensive single purpose national program for family planning. A massive investment of funds had concentrated largely on sterilization camps for vasectomy and tubectomy. The mass approach of inserting IUD's, also in camps, had produced a serious backlash five years earlier. Increasing use of incentives and pressure over the years led to negative reactions among the population. The verbal commitment to integrated services which had been made much earlier now has become the basis for the national program.

Specific Policy Questions Studied

Integration has been a rather diffuse topic with many interpretations. The need for specification led us to convert the scientific hypotheses that we used in originally setting up the experimental design into a series of specific policy questions. In Chapter 9 our findings are summarized according to these policy questions:

1. How Does Integration with Health Services Facilitate Family Planning Use?
 - a. What effect did prior use of traditional and modern methods of family planning have on program use?
 - b. What components of health services are most effective in promoting family planning use?
 - c. When and in what sequence should services be integrated?
 - d. What sociodemographic factors influence the effectiveness of integrated services in promoting family planning?
 - e. Who should provide integrated services?
 - f. What was the effect of integration on specific family planning methods?
 - g. What impact on fertility was achieved?
2. What impact can integrated services have on health?
3. How can efficiencies be increased in integrated services?
 - a. What components of integrated services make the best use of personnel time and are most cost/effective for both family planning and health benefits?

- b. What are the trade-offs of various types of health services and sociodemographic variables in their impact on family planning?
 - c. What cost considerations are important in decisions about integrating various components of health services with family planning?
 - d. What specific management and organizational changes are needed to promote integration?
4. How can integrated services achieve equitable coverage of total village communities?
- a. What socioeconomic variables showed the greatest differentials between groups in the baseline situation ?
 - b. What changes indicate that a more equitable distribution of family planning was achieved by integrated services?
 - c. What effect did integration have in overcoming disparities in use of various components of health services?
 - d. What associations with attitudinal factors were demonstrated which may help define target populations for specific service activities?
 - (e.) What organizational and management mechanisms were evolved to implement equitable coverage?
 - f. What proportion of coverage was provided by non-project services?
5. What was the experience relating to the potential of using a single-purpose family planning approach?
6. How generalizable were the research findings in view of the rapid economic growth and social change in the Punjab?

Obviously there are trade-offs in choice among the policy objectives

implicit in these questions. Particular care is needed in balancing consideration of efficiency and equity. The relative strength of motivational constraints or facilitating factors will influence both cost/effectiveness and equity considerations but oftentimes in opposite directions. For example, exclusive attention to cost/effectiveness in promoting family planning might lead to focussing on upper socioeconomic groups rather than the poor who would be the major concern if the objective were equity.

Background Information

Attempts to unravel the multicausal determinants of population growth have in the past relied mainly on increasingly sophisticated statistical analysis of cross-sectional surveys to determine spontaneous associations among variables (Freedman 1976; Kendal 1979). Such interpretations of factors which influence population growth and national development do not necessarily help understanding of what happens when various kinds of program interventions or social change mechanisms are introduced deliberately. This kind of information can be obtained best from prospective field trials such as the one reported here.

Recent analysis of experiences in several developing countries has confirmed the direct impact of family planning services in reducing population growth (Mauldin 1978) but it is evident that more will have to be done to maintain fertility decline. Largely as a result of the apparent success of programs in countries such as China, the projection of world population in the year 2000 has come down from over 7 billion ten years ago and between 6 and 7 billion five years ago (World Bank 1974) to about 6 billion now (Bogue 1978). There is little substantive information on how family planning

practice can be influenced by program interventions from other development sectors (Ridker 1976).

This study focussed on health because it has the most natural program linkages to family planning. Experience in an increasing number of countries has led to rejection of the "trickle-down" theory of economic development and a parallel growing awareness of the need for allocating resources to social development with the expectation that this will contribute to rapid fertility decline (Refs: Wolfson, ODC). In spite of the rhetoric about social justice, however, decision making has been "trickle-denial" as legitimate claims to equity are filtered out in implementation and benefits still remain with the elite. Skepticism remains about whether the new emphasis on equity can be implemented. Economic planners have been most comfortable with studies which measure economic effects since they seem precisely quantifiable while social development forces have seemed vague, mystical and as diffusely pervasive as gravitation with few clearly definable indicators which can be used to measure social development.

In spite of these problems of measurement, general experience suggests that one of the best ways of bringing mortality and fertility into balance at the low levels characteristic of a developed state is through direct measures to improve social equity and distributive justice. It would be a fortunate coincidence if an objective that carries such a strong moral and political imperative could also be shown by scientific data to be important in solving the world's population problem. Other than political revolutions the most direct way of improving equity is obviously to provide

the poorest segments of the population with improved access to resources and better coverage of special services to improve basic requirements of life. Especially since health and nutrition costs make up a large proportion of the expenditures of poor people, this would be particularly true of health interventions. An indication of the importance of health in development is that in the general Physical Quality of Life Index (Grant 1978), three indicators (infant mortality, life expectancy, and literacy) were found to be most useful, of which two are basically health indices.

Of special interest is the experience of Sri Lanka (Marshall 1978) and Kerala State in South India (Ratcliffe 1978) where political decisions permit separating economic from social influence. Both governments provided nearly universal coverage with health care, family planning, education and basic nutrition but have experienced almost zero growth in GNP. Birth rates declined more than 10 points in ten years. The general conclusion emerges that it is not necessary to wait until people have enough money to pay for social services themselves. In the long run, of course, economic development is essential to support social services. These national experiences suggest the special need now for studies which attempt to dissect causal relationships among social development variables to guide policy decisions and program planning.

Even though there have been many observational studies, surveys and evaluations of family planning programs few projects have attempted to test experimentally the relative strength of potential program variables in influencing the success of family planning programs. One of the most

notable field projects in India was the Khanna Project which was conducted in Ludhiana District, just 26 miles from Narangwal, in the Punjab some ten years earlier than this study (Wyon and Gordon 1971). The Khanna Project provided unique and extremely valuable data on the epidemiology of fertility and a wealth of information on methodology. Impact of family planning was minimal partly because foam tablets were the only contraceptive used. Their field work was especially sensitive to what people in the villages were really thinking and their reports stressed the importance of socio-economic considerations in the rational approach of village people to the overall problems of fertility. A great deal was added to understanding of why village people are cautious in their approach to family planning. Five principles of population control were defined as probably being important in future planning: reduce child mortality, encourage social and material progress, promote community education, provide inducements for delayed marriage and small families and ensure birth control availability, suitability and efficiency. One member of our research team had been involved in setting up the Khanna Project but not in its analysis or write-up and, therefore, it was natural that there should be a great deal of carry over of lessons from the Khanna experience.

As far as we know, Narangwal was the first field project to attempt to measure in a prospective and controlled experimental design the interactions between various combinations of health services and family planning. Following the start of the Narangwal Project a study with similar objectives but a very different experimental design was conducted in Danfa, Ghana (Ref:). Family planning acceptance increased from 11 percent in 1972 to 34 percent in 1977 in the area with most intensive services.

In an area with health education and family planning the increase was from 7 percent to 21 percent and in an area with family planning only from 2 percent to 8 percent. The main contribution of the project was to show that acceptable services can be developed at reasonable cost under the special conditions of Africa.

A larger demonstration project was undertaken during the period 1974-79 to improve primary health care coverage in Lampang Province, Thailand with population in excess of 600,000. Although not strictly designed as a research project, its potential value as a prototype for replication led to the designation of control districts and employment of a relatively sophisticated system of data gathering and evaluation. Through the training of 96 medical assistants and 901 community health volunteers, substantial increases in services utilization have been achieved, but difficulties have been encountered in supervising the large, dispersed cadre of volunteers. Definitive evaluation, adapted from the Narangwal analysis scheme is currently underway. Meanwhile, much of the operational program is in the process of replication nationally with World Bank support.

These are the only controlled comparisons currently available on the impact of health interventions on family planning and fertility. Some related information can be derived from demonstration projects without control groups where the effect of innovative integrated service packages was measured over time, such as the Companiganj Project in Bangladesh (McCord 1977), the Population Council's projects in the Philippines, Indonesia, Turkey and Nigeria, projects developed by the Aroles, P.M.Shah, Antia, Coyojee and Rao in Maharashtra and in increasing numbers in all parts of India.

Rationale for Integration

Abundant evidence shows that high fertility and short birth intervals are extremely damaging to the health of mothers and children under the nutritional and environmental conditions of most developing countries (Omran 19). The converse influences of health on population growth are much more complicated and continue to be the focus of a significant policy confrontation in many countries and international agencies. The obvious direct effect of better health is to reduce mortality while fertility remains high leading to population increase. Of more interest for its long term effect is a group of interacting factors through which health services may directly and indirectly promote family planning and thus reduce fertility.

The arguments against integration usually emphasize the ineffectiveness, inefficiency and low status of ministries of health. It is said that family planning cannot wait for health services which often are not readily available to village families and that family planning services can be more effectively and efficiently provided as a separate activity.

Six sets of arguments support the benefits to be achieved by integrating health and family planning programs. The first is program efficiency and effectiveness. A rather small and transient increase in family planning use can be produced just by providing services to meet existing demand. For continuing fertility effects, however, it is necessary to increase demand by influencing motivation for family planning by the most direct means available. There are obvious organizational benefits to be obtained by combining health and family planning services. Rather than having four to six workers carry out one task each, it is more efficient

to have one worker carry out several tasks if the whole package can be kept simple enough for consistent performance. This makes more effective use of available supplies, equipment, transportation time, facilities, personnel training and organizational structure. Overloading of tasks can be prevented by keeping the population to be covered and the package of services reasonably small.

Second, integrated programs provide greater diversity of responsibility and, therefore, more challenge to field workers. The deadening effect of a repetitive routine doing only one task can make it hard to maintain the motivation that leads to good quality service. It helps to have some variation in tasks so that the worker can get a favorable response from the people for at least part of their activities. One of the dangers of integration is that if overloading occurs, workers will simply concentrate on activities that they are most comfortable with or those that bring the greatest rewards and social response. Since health workers are not usually spontaneously interested in family planning, it is especially important that the service set up specific routines to facilitate coverage of family planning tasks together with good management and supportive supervision to ensure appropriate high priority and continuing attention; otherwise, curative activities will crowd out both preventive health services and family planning.

Third, integrated services make more sense to families. When a health or family planning worker visits homes, patients like to have multiple problems cared for rather than being put off by classifications of personnel which they do not understand. In a clinic also, they prefer to get care for themselves and their children from one person rather than going to a sequence of clinics at different times.

A fourth consideration is that there are major public relations benefits to be achieved by putting together activities for which the public demand is equivocal with medical care programs which are spontaneously and continuously in demand. This public rapport is based on the observation that even though some parents are eager for family planning because they have more children than they can care for, in general the much larger number of low parity parents who are demographically important will continue to be ambivalent in their motivation. For these parents it seems important to have a convincing case made for early spacing or limitation by a health worker whom they have learned to trust because he or she has provided continuing help for health problems.

A fifth reason is that family planning for women has been shown in hospital postpartum studies to be especially effective when provided as a routine part of maternal care because of high motivation related to pregnancy. When a gradual process of education is started during the prenatal period, the mother accepts as perfectly natural the proposition that family planning should be started after delivery both to protect her own health and the well being of the child. In the follow-up that is part of the normal maternal care routine, family planning entry points can be identified and readily introduced. The reasons for high motivation at this time are not hard to identify. In addition to health arguments, there are social, economic and time considerations relating to the difficulties parents would have in caring for the children they now have if another pregnancy supervened. In addition, there seems to be an important psychological consideration; having just passed through one pregnancy, mothers tend to want a period of respite before again becoming pregnant. Cultural patterns and prolonged

lactation tend to support such spacing but are becoming less effective in rapidly changing societies.

Finally, there is the open question, do changes in child survival influence motivation for family planning? The principal hypothesis that this project was set up to test was that the experience and/or expectation of infant and child mortality will hinder significant movement toward practice of family planning. According to this view, as long as the proportion of children who die in childhood remains substantial, there is a major psychological obstacle to be overcome in promoting family limitation. Thus, significant reduction in child mortality may be an important, although perhaps not essential, means of encouraging a decrease in fertility in areas where both fertility and mortality are high. Continued expectations of high mortality would produce a lag period in family planning acceptance. It would be expected then that efforts directed specifically toward the reduction of child loss and especially toward increasing the perception of greater child survival, although not guaranteeing fertility decline, could shorten the demographically important lag between the decline of mortality and fertility rates. Possible reasons for such attitudinal interrelationships are readily mobilized. Children are seen as a source of support in old age. In cultures such as that of the Punjab son preference is strong and has been in fact achieved by the long-standing combination of producing numerous children and a high mortality among girls. The status of a woman depends on whether she produces sons. In almost all cultures many of the satisfactions of family life derive from having children around as long as possible. The actual number of children produced depends on the balance between reproduction and survival, and in terms of emotional

investment there is probably more concern with the latter than the former. "Insurance" and "replacement" are two categories of motivational influences that relate to whether these concerns will be manifest before or after a child dies.

If child survival influences motivation to family planning it probably operates differently at various stages of development and in the context of other forces influencing fertility attitudes. From our earlier work in Punjab villages it was evident that the effect is not automatic. There is certainly not a reflexive one-to-one replacement of children that are lost as suggested in the "theory of demographic transition" which has been shown to have been overly simplistic (Coale 19). A recent conference report summarizes some of the evidence relating to replacement effects (Preston 1978). The well documented shortening of inter-pregnancy intervals after a child death was shown to be due mostly to removal of the biological protection from pregnancy provided by lactational amenorrhea. Separate but somewhat smaller reductions in birth intervals after child death, presumably due to replacement motivation, was demonstrated in situations where lactation could not have been the explanation (Taylor, Newman and Kelly 1976). A general consensus has emerged that motivational influences may be associated with a 30-50 percent replacement of children lost (Preston 1978, op cit; Pop Study)

A recent careful longitudinal analysis of Korean data showed that with declining death rates the frequency of child deaths became so low that it could have contributed only about 3 percentage points to reduction in the number of births (Korean data, Park et al). Before 1965 most of this effect was due to lactational amenorrhea and after 1965 when the National Family Planning Program became effective the replacement motivation effect

became more important. This supports the general experience (Preston) that the motivational influences which lead to replacement of children who die can be demonstrated mainly in countries such as France, Taiwan and Turkey where general development has occurred and where parents are deliberately limiting family size. As long as reproductive performance is uncontrolled and people are fatalistically or enthusiastically accepting whatever children come, there is little restraint on fertility which can be removed in response to replacement motivation. Replacing a child implies an uncompleted ideal family size and therefore it would be a factor only up to whatever norm families implicitly accept. Therefore, the partial replacement for motivational reasons of children who die is not an important force in maintaining high birth rates in less developed countries. From the policy point of view, however, there is no justification for the further assumption that has been made that this finding disproves the child survival hypothesis.

In high mortality situations, such as the Punjab, the more relevant but difficult to measure factor is "insurance" motivation which leads parents to have extra children because they expect some to die. Early studies referred to this attitude as being "volitional" (Henry 19), but we have found it necessary to separate volitional from subconscious expectations. Early in this research (1970 Narangwal Conf. Report) we showed that only 10-15 percent of parents responded positively when asked whether they were having more children because of fear that some might die, with 45 percent saying they had never thought of the possibility. Cross-tabulation showed statistically significant associations between expectation of child death and readiness to practice family planning,

suggesting that subconscious insurance motivation needs to be studied if we can define appropriate measures. In developing the service packages then a particular effort was made to make parents aware of improved chances of survival through health services so as to encourage the practice of family planning.

National decision-makers cannot accept the suggestions occasionally made by international experts that child health services should remain undeveloped while concentrating on family planning. In any case, the first thing that people do when their living conditions improve is to seek better care for their children. Since both health and family planning services need to be developed it makes sense to maximize the favorable interactions between them rather than continuing to view them as being competitive.

Proponents of single purpose vertical programs often justify separate services because they say that intensive and concentrated effort on single tasks will produce maximum impact and then integration can occur later. The rationale for such an effort is clear if dealing with an infectious disease that can be eradicated. The classic example is smallpox where tremendous savings worldwide have occurred because vaccination programs are no longer necessary. However, malaria programs have had major reversals with massive resurgence because there was no health infrastructure into which the maintenance phase of control programs could be incorporated. With presently available control measures this will be true of almost all of the major diseases.

The case for separate family planning services is even more tenuous. It is true that most countries have unmet existing demand for contraception by parents whose families already exceed their desired family size or ability to care for more children. It seemed to make sense at first to get some family planning services out to them as expeditiously as possible. The general experience has been, however, that when such a service is set up separately from health services long term negative effects have followed. Particularly damaging have been the personnel attitudes created by providing special incentives which reduce subsequent chances for cooperation with health and development workers.

Competitiveness at the periphery makes future efforts to integrate services very difficult because workers have to unlearn so much in order to begin to work effectively in an integrated service. Our experience has been that workers from special programs proved more resistant to taking on expanded activities than workers employed in a comprehensive service from the beginning who seemed more ready to adapt to changed emphases and responsibilities.

Any integrated program should focus on special program priorities within a framework of general services which can achieve benefits similar to vertical programs if equivalent attention is devoted to effective management. If the best management capability has been absorbed by vertical programs which have special glamour and resources it will be impossible to develop a general infrastructure into which these special programs are eventually supposed to integrate.

At top and middle administrative levels the effect of separate services has been just as negative as the problems at the periphery. Virtual paralysis has occurred as special programs spend much of their effort justifying their

separate existence. In India, rudimentary maternal and child health services were essentially destroyed when the vertical family planning program was started. It is important now in the converse situation that as integration is carried out special provisions should ensure that family planning services are not ignored. A rational approach to integration requires that we get away from looking at the problem purely in either/or terms.

Proponents of separate vertical services generally agree that eventually they will have to be integrated. If two or more separate services are combined after each has become strong the rivalries will be particularly traumatic. An alternative is to add services progressively to one service after it has achieved good coverage. The problem is that each categorical service then sees itself as being the one to which other activities should be added and the problems of eventual integration remain.

The Study Environment

1. Punjab Development

Study of the ecology of population dynamics in village communities must start with a real understanding of the village setting. Punjab villages tend to be progressive. As prime beneficiaries of the Green Revolution, these communities enjoyed socioeconomic development and improvement in access to basic social services before and during this project period.

For those who have not been in the Punjab recently, it may be hard to appreciate the transformation that occurred in some fifteen years. The Green Revolution doubled agricultural production and brought considerable economic affluence even though it went disproportionately to the rich. Money has changed the villages as brick replaced mud, electrification brought labor saving

devices as well as the radio which shattered the peaceful quiet of village life. The paving of village streets eliminated the need for reflexive agility in maneuvering past mud holes. The introduction of mechanized agricultural implements was forced by work pressure to handle the larger crops. Education expanded rapidly so that primary schools for girls and boys are found in almost every village, a high school is available within a few miles and increasing numbers of rural colleges are being started. Paved roads have extended public and private transportation by bus and bicycle. The growing literacy has stimulated increasing availability of written material such as newspapers and magazines. The Punjab has always been known for political activity but village politics have become even more intensive because of the influence that can be exerted by panchayats on local government officials.

One of the great advantages of working in Punjab villages was that the general rate of progress facilitated the process of getting cooperation and feedback from communities as we jointly worked out better ways of doing things. Free and open discussion with the aggressive and vigorous Punjabi villagers in any activity which might benefit them and their children showed a healthy balance between eagerness and reluctance to change. There was gratifying cooperation as local people participated in the research by telling us what would or would not work and suggested better approaches.

2. The Narangwal Research Base

The Narangwal Rural Health Research Center was established in collaboration with the Indian Council of Medical Research near a teaching health center of the Ludhiana Christian Medical College. The health center

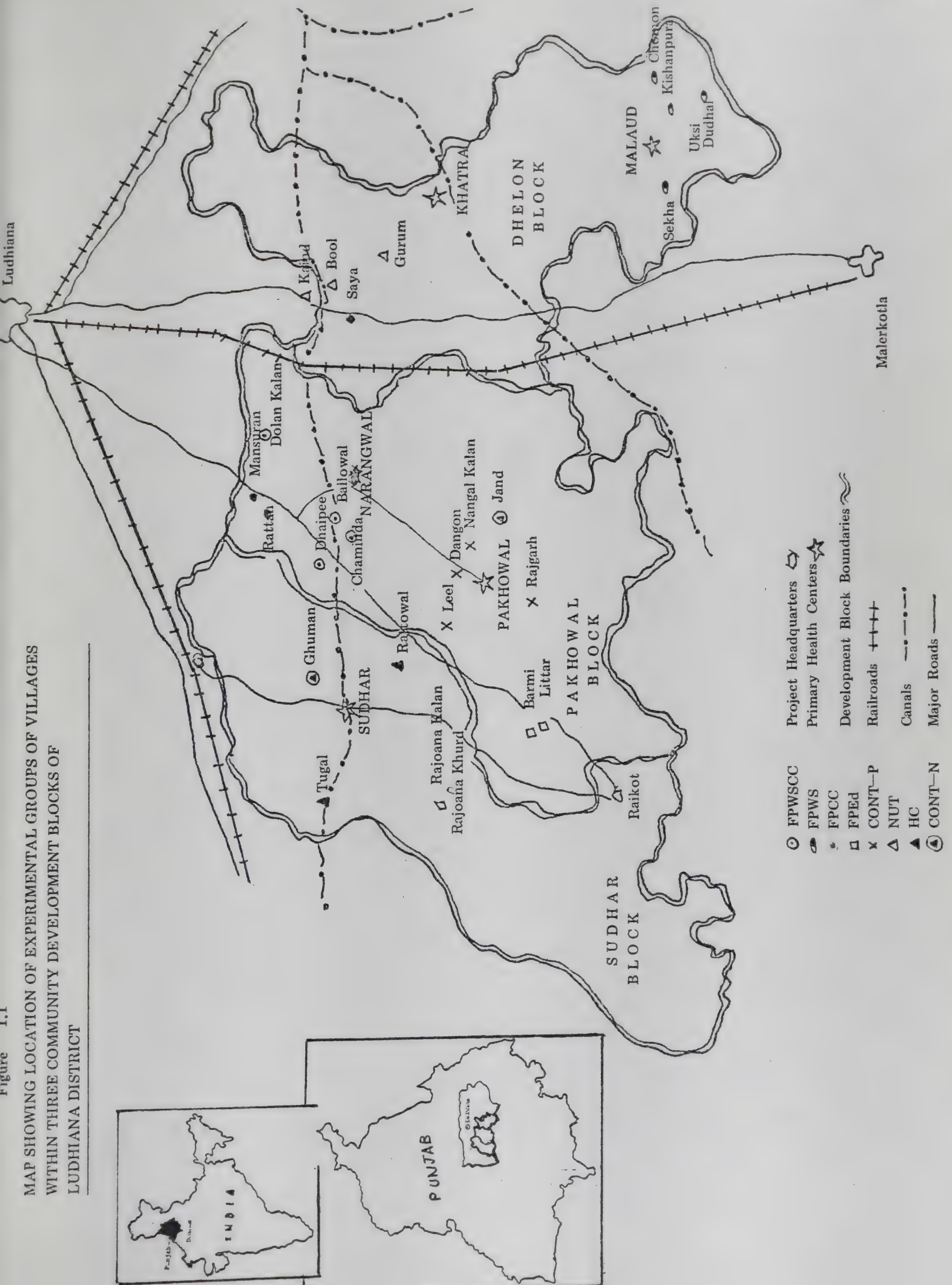
was started in 1955 to provide a base for rural internship training but the Rural Health Research Center was started six years later with an exclusive focus on field research.

Government health services in the area are based on primary health centers (PHC's). Each PHC serves one community development block of between 80,000 and 100,000 population. Narangwal village itself is situated in Pakhowal Block in the south-central section of Ludhiana District. A careful selection process was used to identify 26 experimental villages in 8 clusters with a total population of about 35,000 in Pakhowal, Sudhar and Dehlon Blocks (see Map in Figure 1.1).

Punjab villages are strongly interacting social units, each of which has its own history and village personality. Groups of villages tend to be geographically pocketed and each one has two or three strong factions based on clans or "Pattis" of the dominant Jat Sikh caste. This clustering of characteristics and affiliations produced unexpected problems in getting comparability between experimental groups. All of the usual quantifiable parameters were taken into consideration in selection but there were still major differences in important variables. These are outlined later in this chapter. The lack of homogeneity in more subtle but ultimately more important characteristics such as relative conservatism or willingness to change were obviously impossible to balance in village selection. It was only after the field work began that we realized how different the responses were in various villages, and between groups of villages. According to multiple indicators it happened that the comprehensive integrated care villages were the most conservative in the study, partly because we chose

Figure 1.1

MAP SHOWING LOCATION OF EXPERIMENTAL GROUPS OF VILLAGES
WITHIN THREE COMMUNITY DEVELOPMENT BLOCKS OF
LUDHIANA DISTRICT



them for relative isolation from existing services. This provided even more assurance that the final differences between experimental groups were important because we had to overcome major initial constraints.

A cultural characteristic that especially complicated data gathering was the pattern of village exogamy. All girls marry outside the village and for the first several deliveries women go home to their parents. Well over a third of the births in our population occurred in villages where we had no personnel so that we had to set up elaborate mechanisms for recording incoming and outgoing births. In addition, since women typically go to their parents' homes two to three months before delivery and stay for three to four months after delivery, there was considerable difficulty in getting complete reporting of pregnancy wastage and neonatal and infant mortality and specific measures such as birth weights. From the service point of view this also made it difficult to provide continuity of good maternity services and family planning.

For this study the general fertility trends in rural Punjab are probably the background variable which must be most carefully accounted for in the analysis. There had been a steady decline in fertility during the decade prior to the start of the project in 1969. Data from the Punjab generally and from Ludhiana district show that birth rates had fallen from over 40 to the mid-30's, or something less than one percent per year. Our detailed data from pregnancy histories suggests that in these villages there probably was no general acceleration of the rate of decline prior to or during the study in spite of a massive national program for family planning which got started in 1965 first with IUD's and then sterilization.

An important variable defined in the Khanna Study (Wyon and Gordon 1971)

was the critical importance of increasing age at marriage for women. Background information shows that in our study population mean age at first marriage increased from 12.8 years for those married before 1940 to 19.3 years for those married after 1970. In the Punjab a second ceremony, Muklawā, takes place when cohabitation starts and the mean age for Muklawā for the same groups of women increased from 15 years to 19.8 years.

The fertility patterns of all experimental groups of the research design appeared to have been fairly uniform during the years before the project began. This is indicated by the minimal differences in mean age for given parities or for pregnancy order. For all women in the study population mean parity was 4.0, mean number of pregnancies 4.2 and the mean age at parity 4 was 33 years.

3. The Organizational Background of the Narangwal Population Project

The Narangwal Population Project grew out of prolonged involvement in the life and problems of village India. Members of the staff had spent many years living and working in the villages. A deep empathy with the realities of village life was ensured by the fact that the Rural Health Research Center (RHRC) was located in two adjacent villages of 1,800 and 800 population ("Bara" or Big Narangwal and "Chota" or little Narangwal). All members of the research staff lived in village homes with simple hygienic improvements to demonstrate healthful living. There is a depth of understanding which comes from sharing the life of villagers which cannot be matched by sophisticated data gathering.

The more formal origins of the population project derive from the specific sequence of research activities which had been undertaken at the

Narangwal Rural Health Research Center. The first project at RHRC in 1961 was an in-depth study and a book on the rural orientation of physicians (Doctors for the Villages). This led to a series of studies on indigenous practitioners and the beliefs of village people about diet and disease. In order to study the whole health team, a research project was then undertaken to develop a functional analysis methodology for measuring health needs and resources for primary care services and this also resulted in a book (FAP).

On the basis of this background information two action research projects were started on the two health problems which seemed most important in village India. One was the Narangwal population study reported here. The other was a similar in-depth controlled experiment on the interactions between malnutrition and infections in weaning age children. The nutrition project included all children under three years of age in four groups of villages: one group received nutritional surveillance and supplements; another was provided health care emphasizing infection control through immunizations and early diagnosis and treatment; the third received both nutrition and health care measures (combined services group); and the fourth continued to receive routine government services and served as a control. Dramatic improvements in growth and development, mortality and morbidity were achieved using primary care auxiliaries. The nutrition and population projects were developed in parallel and the combined nutrition and health care group of villages for the nutrition project was also the child care and family planning group of villages for the population project. Our practical field methodology for providing services is summarized in two field manuals for village auxiliaries on child care (Ref) and child nutrition (Ref).

The immediate initiative for this research came from the Ministry of Health and Family Planning of the Government of India. Perceptive national leaders were aware that balanced and continuing long-term development of services would require field research on how to make effective family planning activities part of routine health services.

The Ministry of Health delegated responsibility for the oversight and surveillance of the Narangwal project to the Indian Council of Medical Research so that it became part of the ongoing Indian national research effort. Annual reports were made to the ICMR so as to keep the research in line with national objectives. Direct communications were also maintained with officials in the Ministry of Health and Family Planning and there were numerous site visits and conferences at Narangwal throughout the course of the research. The first feasibility funding was from a PL-480 grant from the U.S. Department of Health, Education and Welfare. The project was greatly expanded with long-term financing from AID. Funds were also contributed by the World Health Organization (H9/181/22 and H9/181/23). Finally, and most important, the commitment of the Indian Government to this research was indicated by their providing direct research grants from ICMR after the PL-480 grant was terminated.

The Framework for Investigation

1. Rationale for Research Approach

Designing a prospective field project of this magnitude introduced major conceptual and methodological problems. One conceptual choice at the beginning was whether to match the overall input of all services in each

experimental cell or to match inputs according to each component of service. To compare the effects of each type of service individually it would obviously have been desirable to equalize each component. This would mean that the comprehensive care villages would receive the additive service inputs of three service components. Since we were interested not in the separate impact of each type of service but in the impact of integrated services, we decided to try the alternative approach and equalize the overall input which meant that effort devoted to any one component in combined programs would be reduced. We expected that improve efficiency and the other benefits expected in integrated programs would compensate for this reduction of effort on any one component. In any case, we developed measurement methods that would give us detailed evidence on inputs in minutes per week of effort that were actually provided.

The inputs for each experimental cell were viewed as being service packages built around the various possible combinations of family planning, women's services and children's services. Rather than just adding activities together, great effort went into working out the best combinations and sequences under field conditions so that activities were truly integrated rather than just juxtaposed. Because our most important objectives were to evolve services for government PHC's we decided not to follow the usual principles of holding to a uniform input throughout the experiment. What we decided was best at the start, frequently was shown to be unworkable or ineffective within a few weeks or months. Holding rigidly to a prescribed service input would have been unethical once we had learned a better way of providing services. In this evolutionary process interaction and feedback

from family health workers and village people was encouraged and proved most constructive and innovative.

Strong convictions about the ethics of research in village communities obliged us to ensure that the rights of village people took precedence over research objectives. The first of these rights was to involve them in planning and implementing the field work. Preliminary negotiations were conducted with panchayats, or elected village councils, and all activities were approved by them. It proved relatively easy to get understanding and concurrence with the notion of an experimental design in which different packages of services were to be offered to various villages. In any case, our services were in addition to the limited care provided by the government primary health center. It was government policy to provide intensive care to the 5,000 people who lived in villages immediately adjacent to the PHC. For ethical reasons, we decided that control villages, the family planning education villages and the family planning and women's services villages which did not receive child care from us should be within or as close as possible to these intensive areas. This diluted considerably the comparability of our controls and made for significant differences in prior use of contraception because the main activity of the PHC's had been family planning. The net effect of these differences, however, is to make our results more convincing.

In order to have a base against which the influence of health services could be measured it was necessary to measure the impact of family planning services alone. An immediate increase in acceptance always occurs when a new program is started because demand for family planning leads people to try out modern methods as a substitute for traditional methods. We expected that practice curves in family planning only villages would plateau in about two years after existing demand for family planning had been met. These

villages presented a particular problem in negotiations because our government advisors considered the existing situation in control villages serviced by the national family planning program to have been essentially a family planning only approach and they were interested mainly in testing other combinations of services. It was finally agreed that the family planning only group should become a family planning education group to see how much an intensive educational program could increase family planning utilization. Rather than using family health workers at the village level, the basic field personnel for this group of villages were family planning educators whose training was as junior basic teachers (JBT) for village schools. Working out these negotiations and funding arrangements took time and therefore services in this group of villages did not get started until more than two years after activities in the first groups of villages.

3. Experimental Design and Data Base

The experimental design grew out of the general hypothesis that attitudes toward and practice of family planning will improve when family planning is integrated with health services. Sub-hypotheses were that each of the separate components of services will have measurable effects and that the dynamics of their interactions can be traced and will define options for policy and program decisions. An additional hypothesis was that a decline in infant and child mortality would lead, after a lag period, to increased contraceptive practice because of attitude changes associated with expectations of increased child survival. We arbitrarily estimated at the beginning that it would take at least 5 years to demonstrate motivational changes resulting from improved child survival. A major problem in analysis was

that political considerations in India-US relations at the time of the Bangladesh war caused termination of the project after only two to four and a half years of full scale service implementation in various experimental groups.

Four experimental groups of villages received different service packages as inputs with a fifth group serving as a control (Figure 1.2). Throughout the remainder of this report they will be identified as follows:

FPWSCC	Family planning, women's services and child care services including nutrition care (mid 1969 through 1973)*
FPWS	Family planning and women's services (mid 1969 through 1973)*
FPCC	Family planning and child care services including nutrition care (1971 through 1973)*
FPED	Family planning education (1972, 1973)*
CONT-P	Control - Population Project

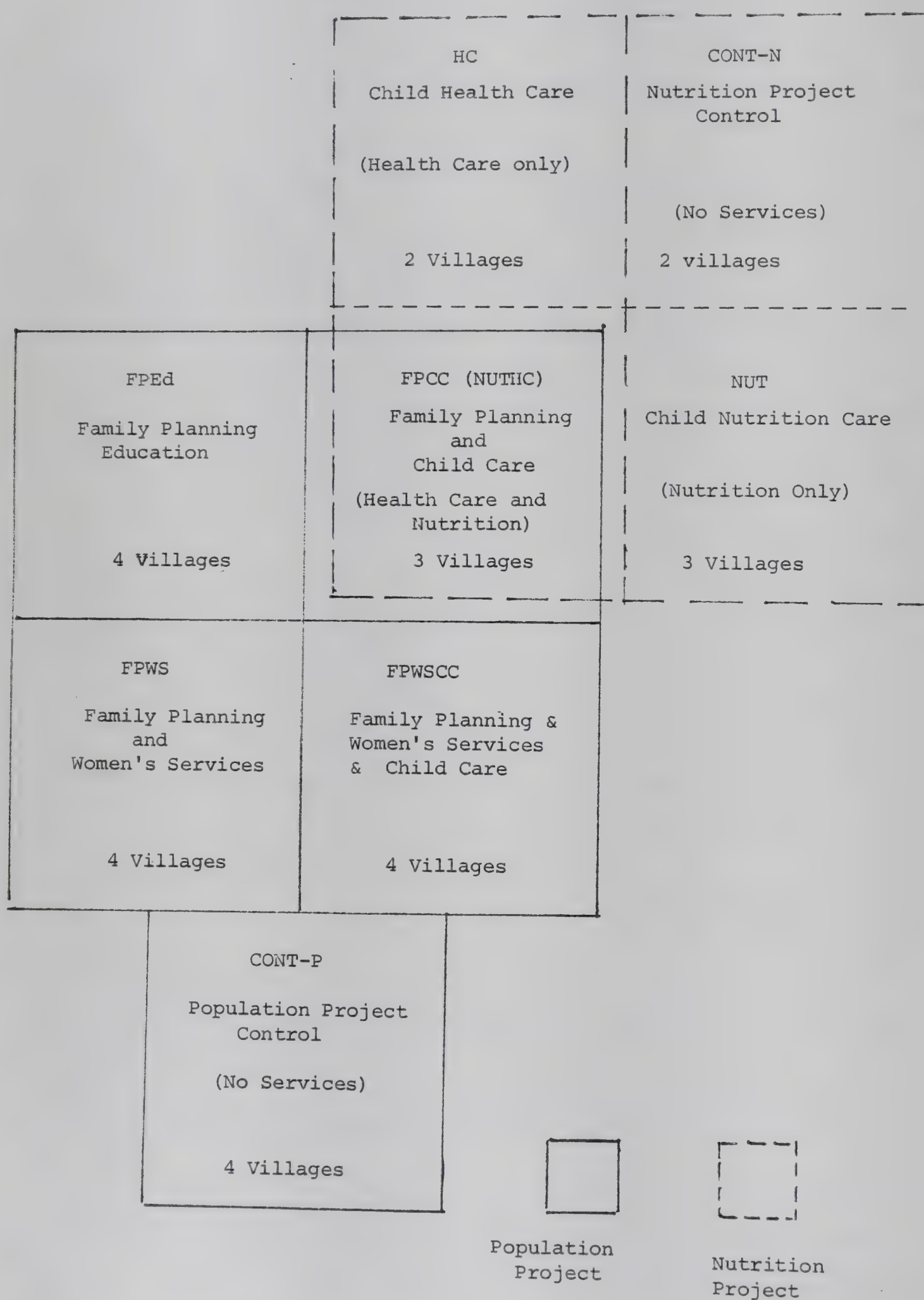
The concurrent nutrition project had four experimental groups of villages which received the following service inputs:

NUTHC	Child care services: nutrition care and health care which was mainly infectious disease control and health education
NUT	Nutrition care
HC	Health care which was mainly infectious disease control and health education
CONT-N	Control - Nutrition Project

One experimental group was included in both projects: the family planning and child care group in the population study (FPCC) was also the child care group including both nutrition care and health care in the nutrition project (NUTHC).

* These dates reflect the period of time during the project when full scale family planning services were provided. In some cases, especially in FPCC villages, some services had been started earlier.

Figure 1.2



a. Variability and Differences in Villages

Experimental field studies testing several different interventions and utilizing controls invariably confront the reality that villages are unique and complex. We attempted to reduce the inevitable differences by selecting and grouping villages to provide relative comparability in major socioeconomic characteristics. Selection criteria also included clustering villages in each group fairly close to each other while keeping the clusters at a reasonable distance from other groups to reduce intergroup contact. Year-round accessibility to four-wheel drive travel within one hour of the project headquarters in Narangwal was the main geographical constraint. Multiple village meetings with village leaders were needed to obtain cooperation.

In spite of these efforts some important differences between experimental groups were found in subsequent analyses (Table 1.1). These include a lower sex ratio in FPEd and control villages; considerable differences in caste distribution with FPEd having 59 percent Jats (high caste Sikhs) compared with a low of 41 percent Jats in FPCC; higher literacy in FPEd (43 percent compared with 26 percent in FPWS); the greatest proportion of landowning farmers in FPEd (55 percent) and the lowest proportion in FPCC (34 percent); the lowest electrification and drain construction rates in FPEd (24 and 16 percent respectively compared with rates of 43 and 55 percent in FPCC); use of tractors ranging from 8 percent in FPWSSC to 28 percent in FPEd; and total income ranging from a low of \$256 per household in FPWS to \$362 in FPEd. In most characteristics the FPEd villages stand out as better off than other villages. In several areas such as sex ratios (108), percent Jats (54 percent), percent laborers (30 percent), tractor use (23 percent), and tubewell ownership (33 percent) the control villages also were better off than the health

Table 1.1

Selected Demographic, Socioeconomic and Other Characteristics of the
Experimental Groups of Villages - 1971

	FPWSCC	FPWS	FPCC	FPED [†]	CONT-P	OTHER
No. of Villages	4	4	3	4	4	7
Census Population *	5877	4614	4623	5661	5047	7379
Sex Ratios (M/F x 100)	117	114	117	111	108	115
Percent Under 15	42.6	42.2	42.0	36.8	39.2	42.3
Percent Women 15-49	20.8	21.4	20.7	22.6	22.7	21.2
" Married Women 15-49	17.9	17.9	17.5	16.5	18.0	16.9
" Women Over 50	6.0	5.9	6.2	6.8	6.3	6.1
Caste Group: % Jat Sikh	50.3	47.3	40.8	59.2	53.9	57.7
% Scheduled Sikh	33.1	32.2	39.2	28.4	34.9	25.7
% Others	16.6	20.5	20.0	12.4	11.2	16.6
Percent Literate	33.1	25.7	34.0	43.2	34.3	38.3
Occupation of Head of Household:						
% Farmers (landowners)	41.7	46.0	33.6	55.2	43.0	46.2
% Laborers	34.5	33.1	35.7	25.3	29.8	25.2
% Others	23.8	20.9	30.7	19.5	27.2	28.6
Housing:						
% All Mud	31.2	34.7	21.0	35.6	33.9	23.6
% Courtyard Handpump	88.9	90.2	93.3	94.4	85.0	90.0
% Lane Drains	44.2	44.0	55.4	16.3	38.8	54.7
% Electrified	42.2	24.7	42.8	24.3	28.6	35.8
Farming:						
Median Land Acreage **	5.7	8.5	5.0	4.9	7.8	5.4
% Tractor Users	8.2	10.8	17.7	27.5	22.8	21.7
% Tubwell Owners	27.2	32.1	21.3	31.9	33.3	32.1
Household Annual Income [†] and Possessions: (US\$)						
Median Total Income	292	256	323	362	289	309
Median Non-Land Inc.	77	140	162	172	75	169
Median Value of Poss.	521	575	508	644	572	612
*** Accessibility (Km)						
To Project Center	4	24	6	17	NA	13
To Closest Other Health Center	4	2	6	8	2	6
To Market Town	13	10	10	4	9	11
To City (Ludhiana)	23	35	19	31	33	24

* Individuals (primarily women and children) identified through provision of services and by means of other surveys, but not innumeration on the census would increase the total population by about 5-6 percent in each experimental group except FPED where no extra people were identified. This would bring the total study population up to about 35,000.

** Median of households owning land

*** Mean distance in kilometers weighted by village population

† Data for FPED is for 1972.

service villages. Additional evidence from the 1961 and 1971 government census of these villages (Table 1.2) reveals that FPEd had a history of higher literacy as well as more rapid improvement in education of women between 1961 and 1971.

The differences that existed between experimental groups indicate that the better results from integration of health and family planning probably would have been even stronger if village differences had not existed. Analyses done at the individual level were able to adjust statistically for those differences.

b. Summary of Variables Investigated

A large number of input, output, outcome variables were measured in the multiple surveys and studies conducted as part of the project. Table 1.3 summarizes the different data sources and the dates during the project when they were carried out. A description of the data collection methods is provided in APPENDIX A. Field projects usually do not undertake detailed measurement of inputs but instead they attempt to control for this by equalizing personnel and resources between comparison groups. Even though we attempted to standardize formal inputs by having one FHW or FPE (Family Health Worker or Family Planning Educator) for each village we realized that the different packages of services would involve quite different responsibilities and time investment. Fortunately, the functional analysis methodology that we had developed earlier (FAP Book) provided an excellent means of getting detailed data on services including counts of service contacts, actual time investment for each function, and detailed costs by specific activities. This provided a basis for using

Table 1.2

The Literate Population in Narangwal Villages:
Indian Government Census 1961 and 1971

Experimental Group	<u>Percent Literate</u>		<u>Sex Ratio of Literate Population</u>	
	1961	1971	1961	1971
FPWSCC	23.22	31.48	241	182
FPWS	24.02	26.15	274	185
FPCC	26.76	33.45	210	178
FPEd	35.45	39.02	211	136
CONT-P	27.02	39.08	NA	151
OTHER	29.22	38.63	200	156
TOTAL	27.87	34.98	—	161

Table 1.3

The following surveys and studies were carried out systematically in all or selected segments of the study population during the time periods indicated below:

<u>Cross-Sectional Surveys</u>			
Baseline Census of Population		1967-68	22 villages
Second Census		1971	22 villages
Baseline Census of of Population		1972	4 villages (FPED)
Third Census		1973	26 villages
Pregnancy History and)	1st survey	1968-69	22 villages
Present Fertility)	2nd survey	1971-72	26 villages
	3rd survey	1974	4 villages (FPWSCC)
Attitudes and Beliefs)	1st survey	1968-69	22 villages
About Family Planning)	2nd survey	1971-72	26 villages
and Child Survival)	3rd survey	1974	4 villages (FPWSCC)
Knowledge and Practice)	1st survey	1968-69	22 villages
of Family Planning)	2nd survey	1971-72	26 villages
	3rd survey	1974	4 villages (FPWSCC)
Socioeconomic Survey	1st survey	1967-68	22 villages
	2nd survey	1971	22 villages
	1st survey	1972	4 villages (FPED)
<u>Longitudinal Data Collection</u>			
Family Planning Practice		1969-74	8 villages
		1971-74	3 villages (FPCC)
		1972-74	4 villages (FPED)
Fertility Status of Eligible Women		1969-74	11 villages
		1971-73	7 villages
Vital Statistics - Births and Deaths)		1969-74	22 villages
)		1972-74	4 villages (FPED)
- Marriages		1972-74	26 villages
Morbidity of Children		1968-73	10 villages
Anthropometric Measurement of Children		1968-73	14 villages
<u>Service Input Information</u>			
Health Service Utilization)		1972-73	26 villages
Sample Survey)		1973-74	19 villages
Service Records		1969-74	18 villages
		1972-74	4 villages (FPED)
Work Sampling		1971-72	18 villages
		1973-74	15 villages
Costs		1969-73	7 villages
		1969-74	11 villages
		1972-74	4 villages (FPED)

quantitative measures of services as independent variables in input-output-outcome analysis and for performing detailed cost/effectiveness determinations.

To define background factors which influenced program results, measurements were made of multiple socioeconomic, demographic and attitudinal variables. These included some factors identified in the rapidly increasing body of theory (Easterlin 1974; Ridker 19) as variables which are most likely to influence population, such as: educational level, role and occupational opportunities for women, communication between husband and wife, the economic value of children, and attitudes toward planning for the future.

Analyses reported in this monograph have focussed on the variables that have the greatest policy relevance. A listing of all these variables with their identifying acronyms (used subsequently in tables, figures and text) and a brief description of each follows. Variations in the classification of any given variable pertinent to a specific analysis will be described with that analysis in the appropriate chapter.

1) Demographic (DEM) - Age, sex, marital status, parity, number of living children, number of children who had died, and dates of entrance and exit from the study population were used as important control variables as well as to develop specific population denominators.

2) Socioeconomic (SE) - Religion and caste groups (RCAST), husband's education (HEDUC), husband's occupation (HOCC), household income (INC), household land ownership (LAND), and possession of selected household items (POSSES) were used to measure individual and household characteristics.

3) Attitudes and Beliefs (AB) - Approval of family planning for themselves (APPR) or for newlyweds (NEWAPPR); and beliefs about changes in child mortality (DIE), chances of children surviving (SURV) or a combination variable (DIESURV) were obtained from questionnaire responses of married women between 15-49 years of age. An important index proved to be whether husbands and wives talked about family planning (TALK), a variable that we assume to be an indicator of a woman's feeling of independence and ability to participate in decisions generally.

4) Knowledge and Practice (KP) - Awareness of methods of contraception (AWARE) and use of contraception prior to the start of the project (PRIOR) were available for all married women 15-49 years of age.

5) Fertility and Mortality - All births and deaths (including fetal, infant and child) occurring prior to the start of the project were recorded in a detailed pregnancy history for married women 15-49 years of age. All births and deaths (all ages) during the project were recorded as they occurred using multiple sources of reporting.

6) Morbidity and Growth - Longitudinal periodic measures of days of selected illness symptoms, weight and height of children under three years of age were collected in child care villages overlapping with the nutrition project.

7) Counting of Program Services - Services received by individuals were categorized as:

a) Women's illness care (WILL) - visits or contacts related to women's illnesses - usually initiated by ill women or their families and most often occurring in the village clinic.

b) Women's other care (WOTH) - contacts initiated by project health workers through routine home visits to women for fertility surveillance, health education, family planning motivation and preventive care.

c) Children's illness care (CILL) - visits or contacts for curative purposes to children of women in the study villages, usually at the families' initiative and usually in the village clinic.

d) Children's other care (COTH) - routine contacts initiated by project health workers for preventive and surveillance purposes (but including early diagnosis and treatment in the home) to children of women in the study villages.

e) Family planning motivation - contacts with husbands (FPMOT) - contacts between male family planning workers and husbands of women in the study villages. These contacts involved general rapport generating activities, health related advice, specific family planning and population education, and motivation to use contraceptives.

f) Family planning services and followup (FPSER) - contacts with both women and men involving actual provision of modern family planning methods or the followup of users.

8) Work Sampling and Cost Analysis - Detailed recording of activity times and costs by functional categories that permitted calculation of minutes per week or costs attributable to specific functions, activities or services. These aggregate time and cost variables were used in analyses at the experimental group level.

9) Use of Non-Project Health Services - Sample household surveys monitored the use of government and private services and related out-of-pocket expenditures in study villages.

10) Program Family Planning Practice (PGM-FP) - Use of modern methods of family planning by anyone in the family planning service villages during the project (1969-1973) was recorded by type of method and dates of use.

c. Project Services

As the services evolved during the course of the study, great care was taken to ensure that each activity remained within the specific program category prescribed for that experimental group. The project services are summarized in Table 1.4 and are described in more detail in APPENDIX B. Services were never static but continued to evolve so that particular activities became more relevant and realistic. The analysis was further complicated because we did not start services in all village groups at the same time.

4. Analytic Model

To systematize the process of developing policy and programs which promote family planning and fertility reduction requires a complex model, Figure 1.3. We used this analytic model in the analyses to help select the interactions between variables to be tested most intensively. Conceptually we found it necessary first to separate inputs, outputs and outcomes.

Inputs include two groups of variables - those that were taken as given in our study and those that we considered appropriate to manipulate experimentally. The former can be visualized best as a cluster whose influence can either be grouped or studied individually. In the model

Table 1.4

SUMMARY OF SERVICE INPUTS

FAMILY PLANNING

- | | |
|-----------------------------|--|
| 1. Education and Motivation | Intense educational efforts were provided in FPED; education was well integrated with health care delivery in FPWSCC and FPWS; and less adequately integrated in FPCC. |
| 2. Contraceptive Services | Condoms, pills; IUD's; injectable DepoProvera; vasectomies and tubectomies were provided under similar conditions in all experimental groups. |
| 3. Follow-up | The same method - specific patterns of follow-up were established for all groups. |

WOMEN'S SERVICES

- | | |
|---|--|
| 1. Monitoring fertility and early diagnosis of pregnancy | Routine in FPWSCC, FPWS and FPCC; carried out in simplified form in FPED. |
| 2. Prenatal and postnatal care and supervision of deliveries done by dais (indigenous midwives) | Well developed pattern in FPWSCC and FPWS modified prenatal care provided in FPCC to protect the child |
| 3. Diagnosis, treatment and referral of illnesses | Done only in FPWSCC and FPWS |

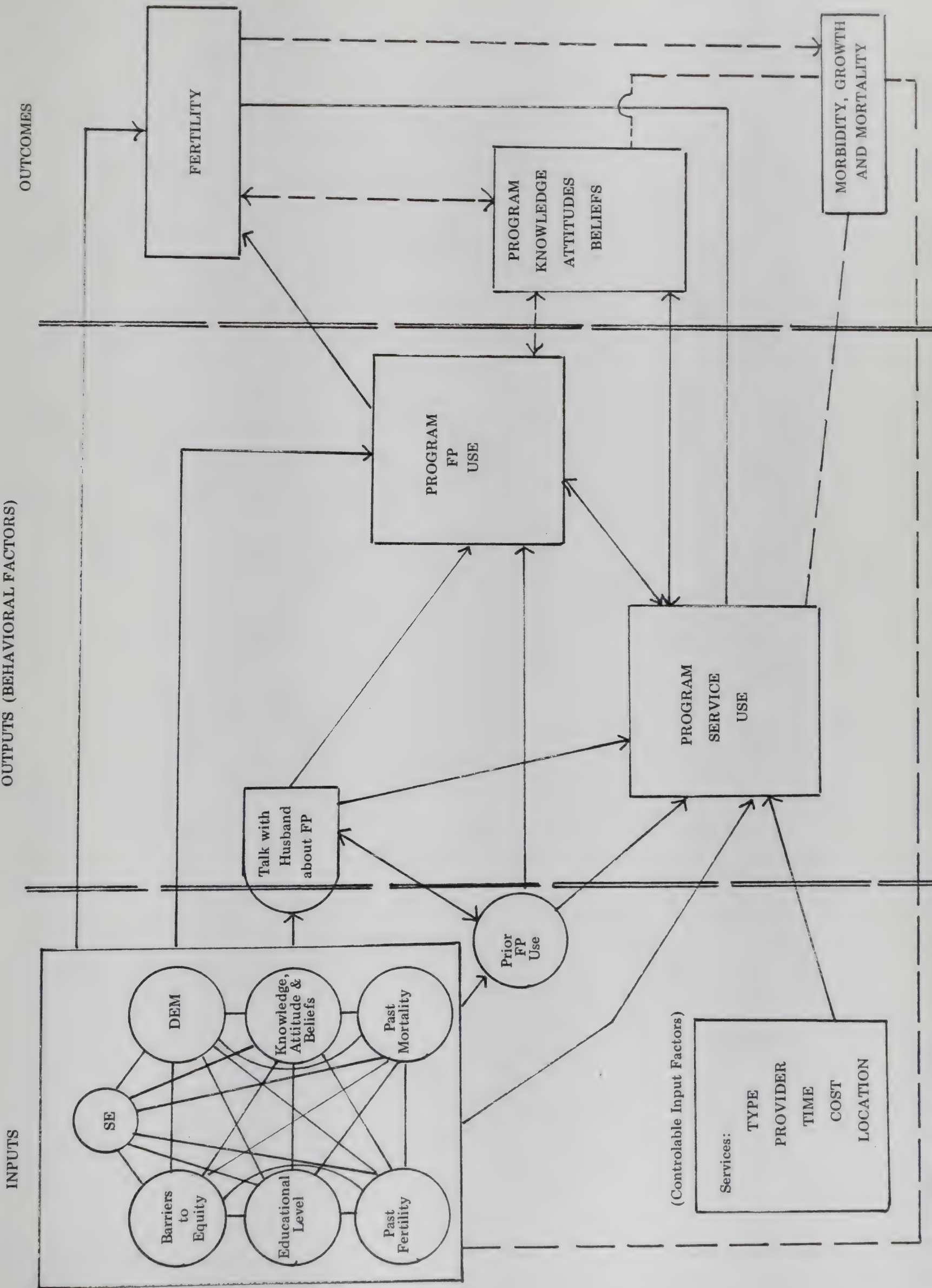
CHILD CARE

- | | |
|---|--|
| 1. Periodic health surveillance and education up to 3 years | Weekly monitoring of morbidity status in FPCC; much less frequent (about every 2 months) home visiting in FPWSCC. |
| 2. Periodic measurement of weight and height | Routine ranged from every month for infants to every 3 months at 3 years of age for FPWSCC and FPCC. |
| 3. Immunization | Routine smallpox and DPT and periodic BCG, polio and measles in FPWSCC and FPCC. |
| 4. Nutrition supplementation and education | Selective provision of supplements to malnourished or faltering children, and education of mothers of all children in FPWSCC and FPCC. |
| 5. Diagnosis, treatment and referral of illness | Early care emphasized in FPWSCC and FPCC. |

All services in the health care villages were provided by Family Health Workers (FHW) who were auxiliary nurse midwives with two years hospital training beyond high school plus an intensive six to eight weeks retraining period in the project. They were supervised on weekly visits by a doctor and by a public health nurse or lady health visitor.

Family Planning Educators were the peripheral workers in the FPED villages. They were village teachers whose training and supervision parallel the level and intensity of the FHW's.

Figure 1.3
OUTPUTS (BEHAVIORAL FACTORS)



they are identified by circles. These are the variables that most family planning research has focussed on in the past because these data are gathered readily in surveys and have obvious important associations with fertility. In our study, however, they did not receive primary attention because there is little that policy makers can do about changing them except to be aware of their influence in selecting and targetting interventions appropriate for focussed effort. One exception that might be considered manipulable is educational level but we placed it in the category of givens because it was outside of our competence and time constraints. We emphasize that we do not discount the importance of these variables and that broad policy must consider them in balancing population growth with development. Our interest was, however, in factors that could be directly influenced in a short time period and with resources available to Indian health and family planning services.

The major attention in our analysis, therefore, was on controlable input factors which in the model are shown as squares. These variables include health and family planning services identified by type, provider, time required both for the service provider and the people served, location and cost.

We have used the term outputs in a limited meaning referring specifically to readily quantifiable behavioral changes or utilization patterns that resulted from the inputs. Four categories of information were used of which two overlap with inputs as shown by the dotted line. Both prior family planning use and talking with the husband about family planning obviously were carried into the project period as predisposing factors.

For analytic purposes they proved so important that it seemed appropriate to study their patterns of continuity during the project as well as before. The outputs most directly influenced by controllable inputs were use of health and family planning services and specific use of contraceptive methods during the program.

Outcomes are used here to refer to substantive changes that resulted from outputs. These are variables that changed as a result of policy and program decisions. Fertility and mortality are obviously the ultimate outcomes. We have also included knowledge, attitudes and beliefs about family planning and child survival issues because, although these are in a sense intervening variables, they represented so much of the impact that we tried to achieve and measure that they need clear identification.

In the overall analysis the greatest emphasis was placed on family planning practice. Because of the early termination of the project we did not have as many years as we needed to show whether definitive fertility changes were occurring. Fertility data are therefore presented mainly to support family planning data. Similarly, our analysis thus far indicates that only a few of the attitudinal variables that we were measuring changed in the study period. This applies especially to the child survival variables. In the arrangement of chapters we have, therefore, placed family planning practice first, then the use of all services and finally fertility outcomes. The arrows indicate the sub-analyses that have been done to elucidate the composite interactions. The solid lines were the main focus of the analysis reported in this book while those indicated by dotted lines require further analysis.

POP MONOGRAPH

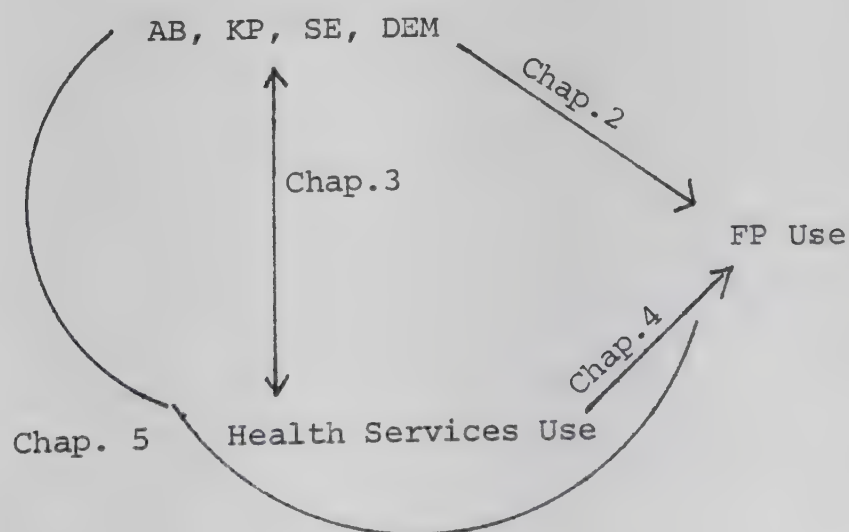
CHAPTER 2

ACHIEVEMENTS IN FAMILY PLANNING USE

R.S.S. Sarma and Rashid Faruquee

Family planning practice was the measure of impact that proved most important in the Narangwal experiment. In this chapter a comparison will be made of time trends in acceptance and practice of family planning in the four experimental groups of villages. Differences in program achievements will be analyzed at the experimental group level to determine how much of the use of contraception could be attributed to specific program combinations.

This chapter and the following three chapters also investigate factors associated with program effectiveness in terms of family planning. The framework of analysis is shown below as a simplified adaptation of Figure 1.3.



The influence of several intervening and exogenous factors on family planning use is examined in this chapter. These factors fall under four headings: attitudes and beliefs (AB), knowledge and prior practice of family planning (KP), socioeconomic status (SE), and demographic factors (DEM). The influence of specific types of family planning methods (traditional or modern) prior to the project and the shift from these methods to program supplied methods is carefully assessed. Association of the AB, KP, SE and DEM factors with use of health services is considered in Chapter 3. The relationship between the latter and family planning use is the focus of Chapter 4. Then, in Chapter 5 the combined influence of health, intervening and exogenous variables is investigated.

Use of Contraceptives

In the Narangwal experiment a range of modern methods of family planning were offered which included the following combination of temporary and permanent methods: condom, IUD, oral pill, injectable Depo-provera, vasectomy and tubectomy. These are referred to hereafter as program methods. Shifting use of contraception was recorded when couples switched from one method to another, even if they waited for some time without protection before again using the same method or another method. About two-thirds of all program users confined their contraceptive practice to one segment of use while the remaining one-third had two or more segments of use. On the average, a contracepting couple had 1.5 segments of use during the program with 1.6 in FPWSCC, 1.5 in FPWS and FPCC, and 1.4 in FPED.

Two simple indices of contraceptive use are ever-user rate and current-user rate. Current-users represent a prevalence rate or the couples practicing contraception at a specified point in time. The ever-user rate also included prior users and reflects the cumulative performance of the program. The ever-user rate can be limited to those who used contraception following the start of the program or it can include contraception prior to the program. Program data were collected on a continuing basis to record couples, with wives in a current married state, and in the 15-49 age group who practiced contraception. Acceptance of program contraceptive methods included only those who used program sources for supplies and services.

1. Acceptance of Program Contraception in Service Groups

Family planning services were started at different points in time in the four experimental groups: full-scale services were in place in most villages in September 1969 in FPWSCC and FPWS, December 1970 in FPCC and June 1972 in FPEd. Within an experimental group introduction of services was phased in gradually with methods for integrating services in a particular program package being worked out in one village and then extended to the others in that group. In 1969 when the program was started it took four to six months to include all villages in an experimental group. It took somewhat less time to phase in the third group in 1970 and the fourth group in 1972.

In planning the experiment the expectation was that field work would continue until the family planning practice curves in each of the experimental groups would have plateaued. This would have made judgements about

the relative effectiveness of the various integrated packages relatively straightforward. We were prepared to continue services for varying periods of time as needed in order to get plateauing. It was postulated that plateauing would occur most rapidly with the family planning education and therefore we felt comfortable starting this group of villages later than the others, when it became necessary to delay its start for logistic and administrative reasons. It was also postulated that to measure a child survival effect an interval of about five years would be needed after child mortality rates dropped. Therefore we anticipated that a longer period of time would be needed to see the full impact in child care villages. The program, however, ended after four and a half years in two experimental groups, after three years in a third group and after less than two years in the fourth group, when all the four family planning curves were still rising.

At the beginning of the program, acceptance rates were between 7 and 14 percent in various experimental groups. In the control villages where family planning data were not collected longitudinally a cross-sectional survey showed that about 9 percent of couples said they were using modern contraceptives at the start of the program. A repeat cross-sectional survey midway through the project in 1972 showed no change in the current-user rate from the pre-program level of 9 percent in control villages. The FPWSCC and FPWS groups with over four years of family planning services reached acceptance rates of 51 to 54 percent. The FPCC group of villages with over three years of family planning services reached 46 percent. A little less than two years of program operation in the FPED

group produced an acceptance rate of 37 percent. The acceptance curves in Figure 2.1 appear almost parallel. Data will be presented to show that much of the acceptance in FPEd was simply substitution as a result of uniquely high pre-program use and related to major intrinsic village differences.

The program acceptance curves shown in Figure 2.1 were based on all acceptors and distinction was not made between those who were pre-program users and who had been non-users of modern methods. It will be shown later that the mix of pre-program users and non-users of modern methods was different in the four experimental groups. Since the program effort needed to recruit acceptors is clearly greater for those who had not been previous users the best indication of program impact is the new acceptor rate. In comparing the four experimental groups we have therefore separated the two categories of program acceptors. Figure 2.2 shows new acceptor rates based on couples who used modern methods for the first time as a result of program activities. They may have used traditional or indigenous methods earlier. Cumulative new-acceptor rates at specified points in time have been computed for the four experimental groups and in comparison with Figure 2.1 it is evident that: one, though the overall acceptor rates were higher in FPWS than in FPWSCC, the new-acceptor rates were lower in FPWS than in FPWSCC; two, the gap between the curves for FPCC and FPEd which disappeared towards the end of the program period in Figure 2.1 remained essentially the same in Figure 2.2. Much greater source-substitution in FPWS and FPEd were responsible for the differences

Figure 2.1

PERCENT CURRENTLY MARRIED WOMEN AGE 15-49 WHO WERE ACCEPTORS
OF FAMILY PLANNING AT SPECIFIED POINTS IN TIME
BY EXPERIMENTAL GROUP

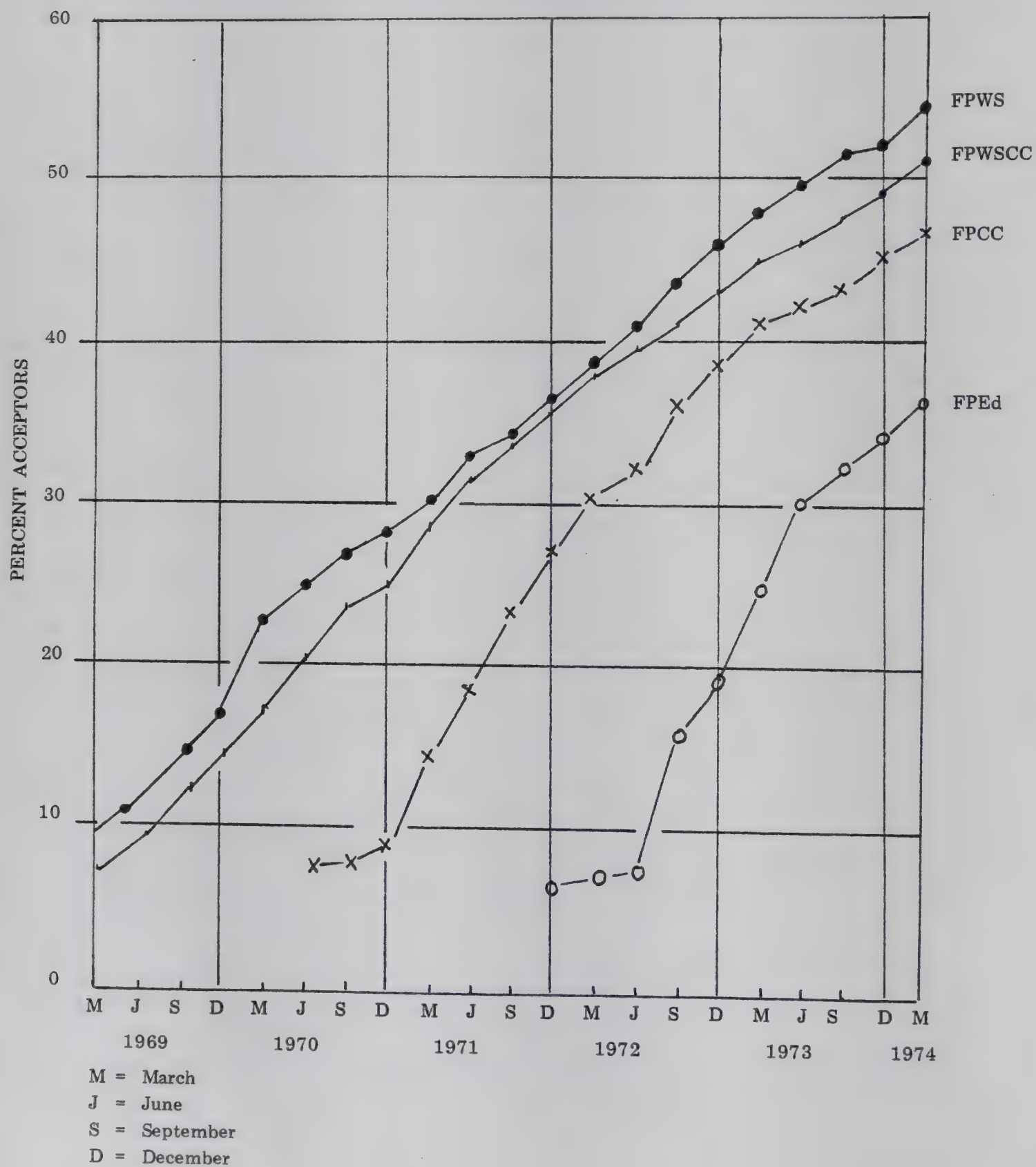
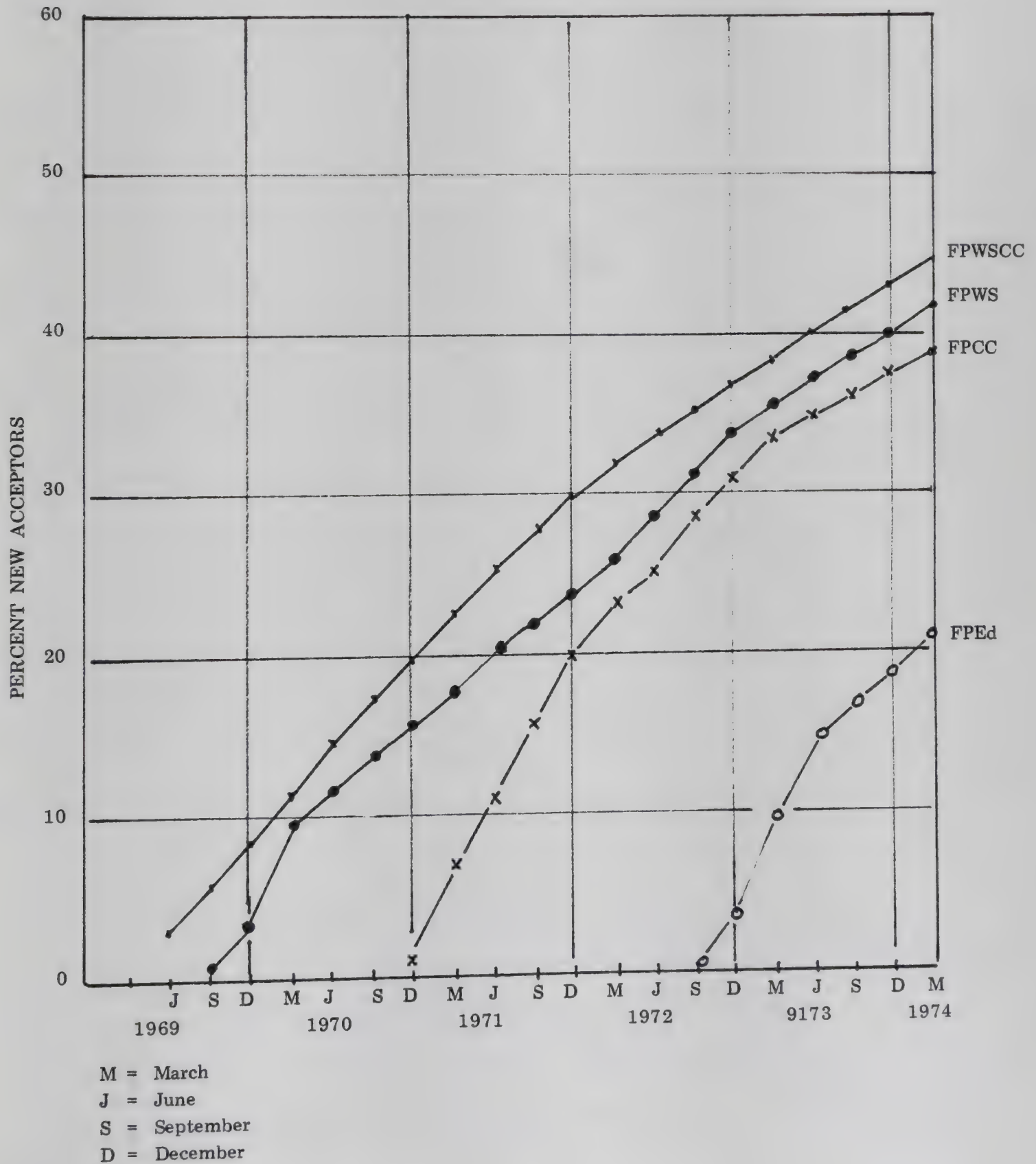


Figure 2.2

CUMULATIVE RATES OF NEW ACCEPTORS IN EXPERIMENTAL GROUPS



between Figures 2.1 and 2.2 and we feel that Figure 2.2 therefore presents a more accurate portrayal of program results.

2. Practice of Program Contraception

The essentially parallel acceptance curves in early stages indicate that the program succeeded in getting couples to start contraception more or less at the same rate in all the experimental groups. More important, however, is a comparison of time trends in continuing-user rates in various experimental groups. The proportions of women actually practicing program contraception at specified points in time are given in Table 2.1, and Figure 2.3 shows curves for the four experimental groups that are not parallel. FPWSCC and FPWS had more or less linear increase while FPCC had an initial rapid rise and tended to plateau. The FPED curve also had an initial rapid increase but had begun to flatten in the second year. These visual impressions of the family planning practice curves were checked by fitting quadratic equations to obtain statistical verification of whether significant plateauing was beginning to appear. The absence of plateauing in FPCC and FPED are confirmed by the statistical significance of quadratic terms in the polynomials fitted to practice rates (Table 2.2). The quadratic terms in the regression equations of FPWSCC and FPWS were statistically not significant while they were significant in the case of FPCC and FPED. The smoothed curves are shown in Figure 2.4. Similar tests of ever-user rates showed no significant differences. These findings fit well with the pattern of curves we had originally postulated as being likely. After an initial rapid increase to meet existing demand we had expected plateauing at various levels. In FPCC we had expected a lag period after which

Percent Currently Married Women Age 15-49 Who Were Acceptors, Continuing-Users and Effective Users at Specified Points in Time, by Experimental Group

Year & Month	FPWSCC	FPWS	FPCC	FPed	FPWSCC	FPWS	FPCC	FPed	FPWSCC	FPWS	FPCC	FPed
1969 Mar. June Sept. Dec.	7.5 9.1 11.6* 14.3	9.5 11.8 13.4* 16.1			7.4 8.5 10.2* 12.1	9.1 11.0 11.5* 13.6			6.3 7.1 8.3* 9.8	7.9 9.7 9.8* 11.3		
1970 Mar. June Sept. Dec.	17.3 20.5 23.7 25.2	22.9 24.8 26.7 28.2	8.1 8.1 8.6*		13.9 16.3 17.9 17.8	19.7 20.4 21.0 22.3	8.0 7.9 8.4*		11.1 12.3 13.5 13.3	15.8 16.0 16.4 17.3	7.6 7.6 7.7	
1971 Mar. June Sept. Dec.	28.5 31.5 33.6 35.5	30.0 33.1 34.0 36.5	14.4 18.6 23.3 27.3		19.2 21.6 22.6 22.7	23.3 25.2 24.2 24.4	14.0 17.3 21.1 23.6		14.3 15.4 16.2 16.3	18.1 19.4 18.6 18.8	11.7 13.6 15.6 16.4	6.1
1972 Mar. June Sept. Dec.	37.8 39.6 41.1 42.8	38.5 40.8 43.7 46.1	30.4 32.2 36.0 38.5	7.2 7.5* 16.2 19.5	23.8 23.9 25.0 26.2	26.4 28.7 31.6 33.8	23.1 24.2 27.3 28.0	7.2 7.3* 15.5 17.8	17.1 17.1 17.7 18.4	20.3 21.6 23.6 25.0	15.1 15.7 18.2 19.0	6.6 6.7* 10.7 12.3
1973 Mar. June Sept. Dec.	45.1 46.1 47.5 49.1	48.2 49.5 51.3 52.1	40.9 42.0 43.1 45.0	25.7 30.6 32.6 34.4	28.0 28.9 29.5 31.7	35.5 36.5 37.8 37.6	27.2 25.6 26.6 27.0	21.1 24.2 25.1 26.5	19.5 20.5 20.8 22.2	26.1 27.3 28.3 28.2	18.9 17.8 18.8 19.4	14.4 16.1 16.6 17.4
1974 Mar.	50.7	54.2	46.2	37.0	34.2	40.9	28.2	29.8	23.8	30.8	20.6	19.5

* Approximate date when introduction of family planning services was completed.

---Dotted lines link rates in the different experimental groups at equivalent points in time following the start of family planning services.

Figure 2.3

PERCENT CURRENTLY MARRIED WOMEN AGE 15-49 WHO WERE PRACTICING
FAMILY PLANNING AT SPECIFIED POINTS IN TIME
BY EXPERIMENTAL GROUP

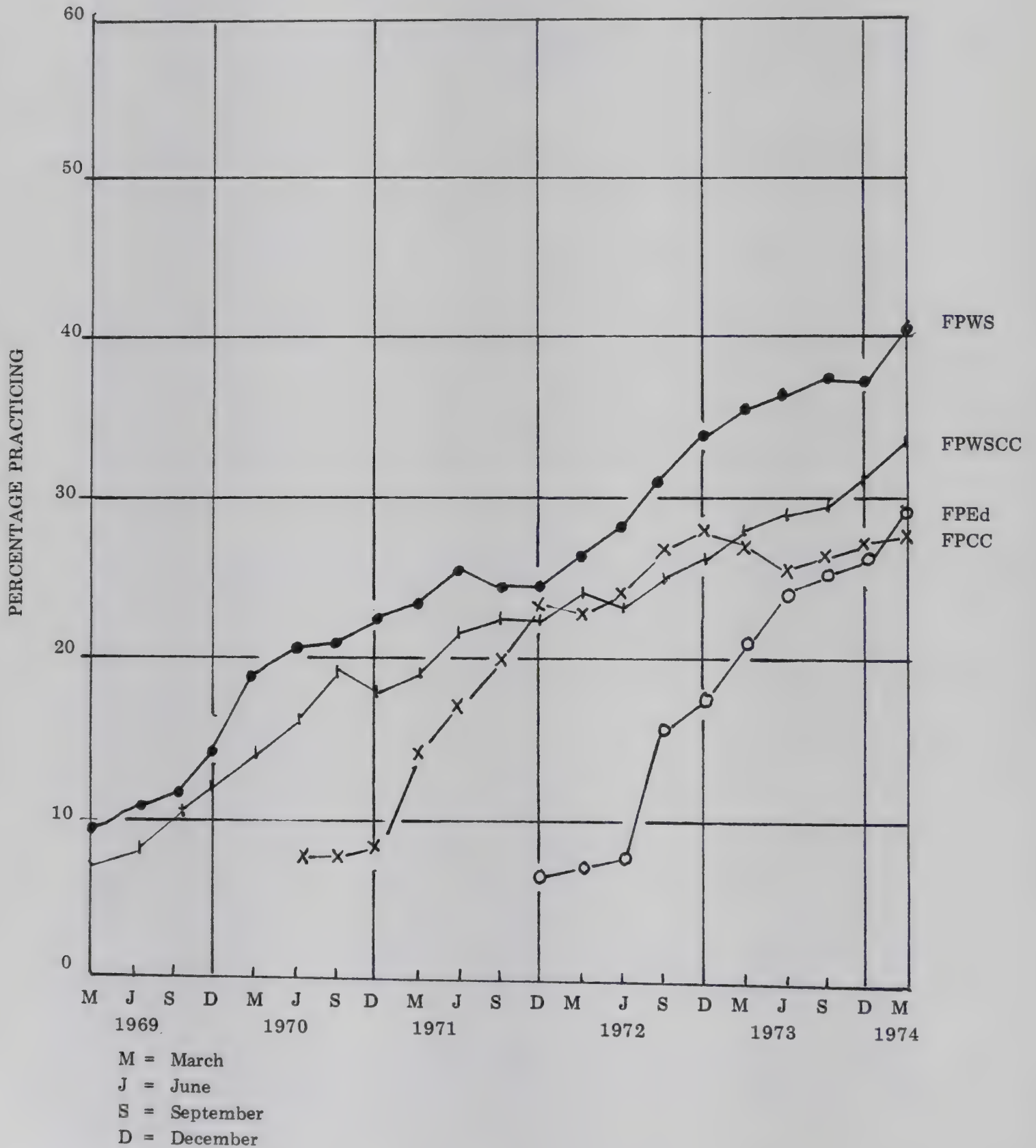


Table 2.2

Fit of Quadratic Equations to Time Trends in Contraceptive Practice
Rates in Experimental Groups

Cohort	Least squares estimates of terms			Proportion of explained variation R^2	Level of Significance of Quadratic Term
	Constant	Linear	Quadratic		
FPWSCC	10.04	1.36	-0.01	.98	>.25
FPWS	12.60	1.42	0.00	.96	>.25
FPCC	6.56	3.96	-0.18	.95	<.05
FPED	3.41	5.69	-0.32	.97	<.05

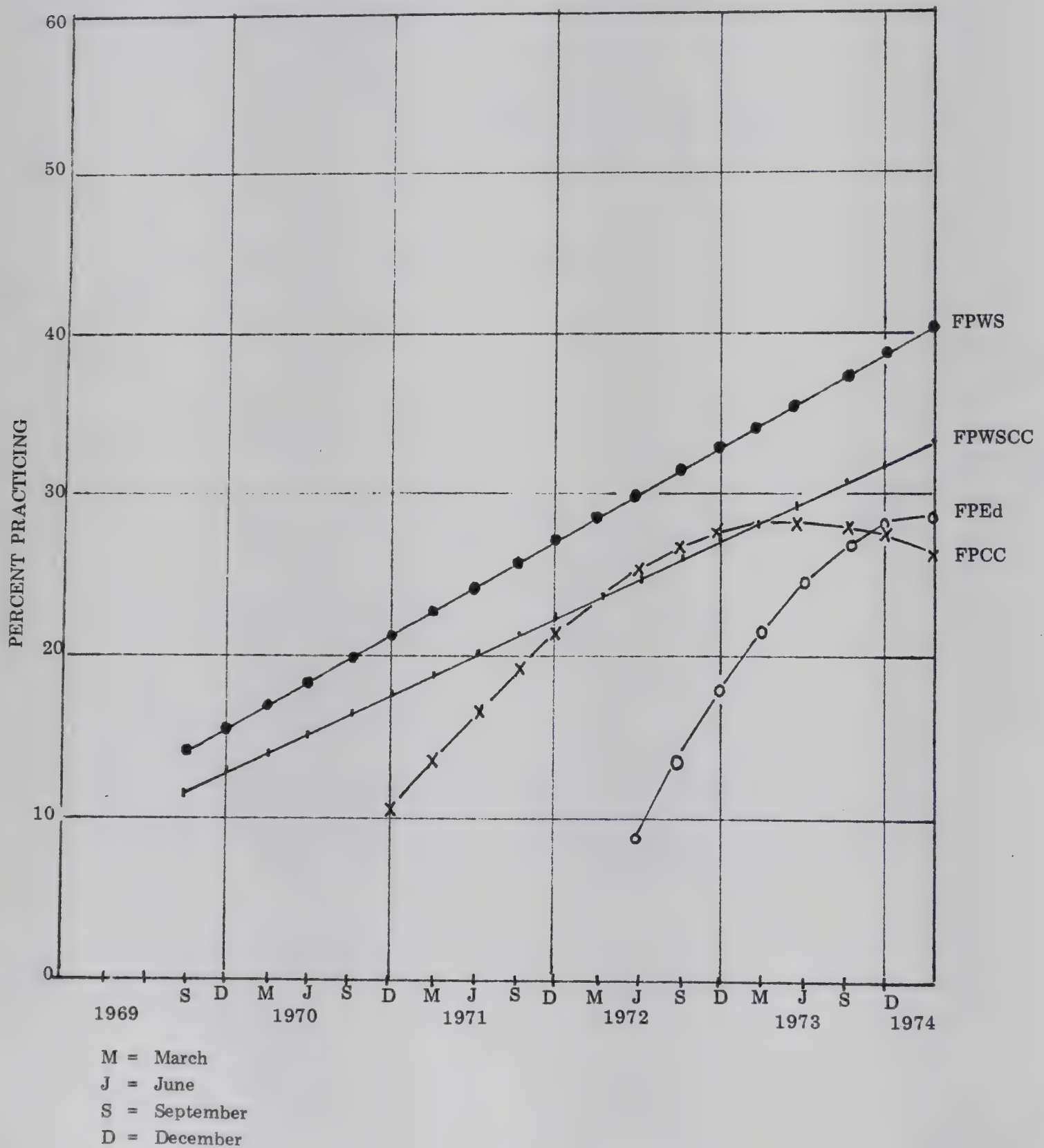
Note: $Y_t = a_0 + a_1 t + a_2 t^2$ was fitted by least squares method where

Y = percent women practicing contraception at time t . a_0 , a_1 and a_2 represent the constant, linear and quadratic terms respectively.

t was given values 1,2,.....19 representing the 19 points in time Sept. 1969, Dec. 1969Mar. 1974 for FPWSCC and FPWS. The time points considered were 14 (from Dec.1970 to Mar. 1974) for FPCC and 8 (from June 1972 to Mar. 1974) for FPED.

Figure 2.4

TRENDS IN CONTRACEPTIVE PRACTICE RATES IN EXPERIMENTAL GROUPS
(Smooth Curves Obtained by Fitting Quadratic Equations to Continuing-User Rates)



the child survival influence would become evident and the curve would begin to rise again.

3. Practice Rates Adjusted for Effectiveness of Contraceptive Methods

The expected impact of the program will obviously depend on the specific contraceptive mixes in experimental groups. In order to obtain practice rates which reflect the expected demographic impact of the program we developed a new measure which adjusted for differences in the effectiveness of contraceptive methods used.

The mix of contraceptives differed greatly between the four experimental groups and changed from time to time within any group. Table 2.3 shows that towards the end of the program almost half of those practicing contraception in FPED group were using condoms. At the other extreme, over 40 percent of those who were practicing in FPCC group at the end of the program were sterilized. Obviously, expectations for eventual demographic impact should be reduced for FPED and increased for FPCC. Particularly impressive was the high general demand for injections and the rapid response to the availability of Depo-provera even though it did produce a high rate of amenorrhea and intermittent bleeding. The greatest variation seemed to be for IUDs and it is our impression that this depended on local rumors about complications after the government's mass program some five years earlier and the differing attitudes of staff members. The highest rate of IUD's was in FPWS where the local PHC at Maloud had done an especially effective job of promoting them and providing follow-up.

Table 2.3

Percentage Distribution of Current Users of Family Planning by Method Currently Being Used as on March 31 of Each Calendar Year by Experimental Group

[illegible]

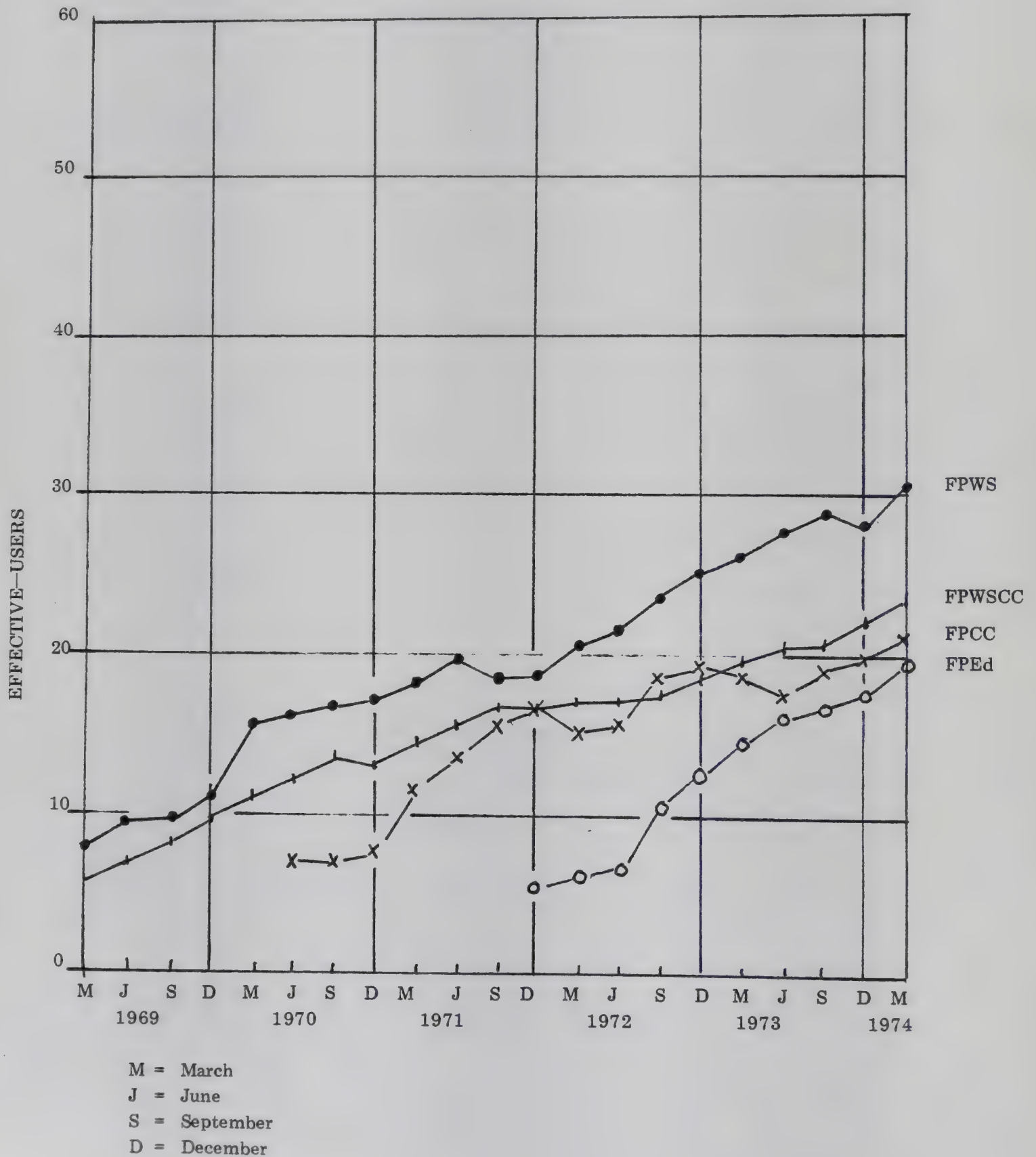
Our analyses of relative effectiveness within the project show that sterilization was the most effective method of contraception, followed by injectable Depo-provera and IUD, with oral pill and condom showing relatively low levels of effectiveness¹. In estimating the impact of differences in contraceptive mix an adjustment factor was applied to the practice rates based on the relative effectiveness of each method used². This yielded an estimated rate reflecting the proportion of married women who were protected from becoming pregnant. Practice rates of contraception corrected for method effectiveness (effective-user rates) are presented in Table 2.1. These corrections lowered practice rates by 10-20 percent at the start of the program and 25-35 percent at the end. The curves of effective-user rates in Figure 2.5 are both lower and flatter than those in Figure 2.3. Fitting quadratic equations to these data again showed distinct differences. Plateauing of effective-user rates had started to appear in

¹ Pregnancy rate for a given contraceptive method is defined as the number of pregnancies occurring per 100 women years of use of the method. In the Narangwal field study the pregnancy rates were found to be 26.8, 29.2, 5.2, 3.1, 1.0 and 1.1 for condom, oral pill, IUD, injection Depo-provera, vasectomy and tubectomy respectively. It is obvious that local acceptance of oral pills was both ineffective and poor. Under no contraception the pregnancy rate was 40.7. Relative effectiveness rate was defined as $1 - \text{Pregnancy Rate}/40.7$. The relative effectiveness rates work out to 0.342, 0.283, 0.872, 0.924, 0.975 and 0.973 for the above methods.

² An adjustment factor was constructed for each experimental group at each point in time. The relative effectiveness rate for each method, obtained earlier, was applied to the actual number of users of that method to get the number of effective users for that method. Total number of effective users was obtained by summing effective users of all methods. The adjustment factor was then obtained as the ratio of total effective users to the total actual users.

Figure 2.5

PERCENT CURRENTLY MARRIED WOMEN AGE 15-49 WHO WERE "EFFECTIVE-USERS"
OF FAMILY PLANNING AT SPECIFIED POINTS IN TIME BY EXPERIMENTAL GROUP



in FPCC and FPED. There was no evidence of plateauing in FPWSCC and FPWS in spite of the fact that these groups were exposed to program services for considerably longer time and had reached considerably higher effective-user rates (Table 2.4). The smoothed curves based on these calculations are shown in Figure 2.6.

4. Adjustment for Differences in Program Duration

Because FPWSCC and FPWS villages were exposed to services for over four years while FPCC and FPED for only three and two years the achievements in family planning cannot be directly compared. Obviously, program performance in March 1974 reflected mainly differences in project time.

In Table 2.1 relative performance of family planning in terms of ever-use (acceptance), continuing use (practice) and effective use rates in the four experimental groups are shown according to a calendar time scale. Relative performance according to an ordinal time scale is indicated by a dotted line linking equivalent points in time. About 21 months of program operation produced ever-user rates of 36.0 and 37.0 percent in FPCC and FPED respectively as compared to 31.5 and 33.1 percent in FPWSCC and FPWS. Continuing user rates were also higher, viz. 27.3 and 29.8 percent in FPCC and FPED which had a later start of the program than those with earlier start, namely FPWSCC and FPWS with 21.6 and 25.2 percent. Because of the slower start-up in the first groups these differences at 21 months between experimental groups are probably unimportant. Comparisons at 39 months in the remaining three groups show smaller

Table 2.4

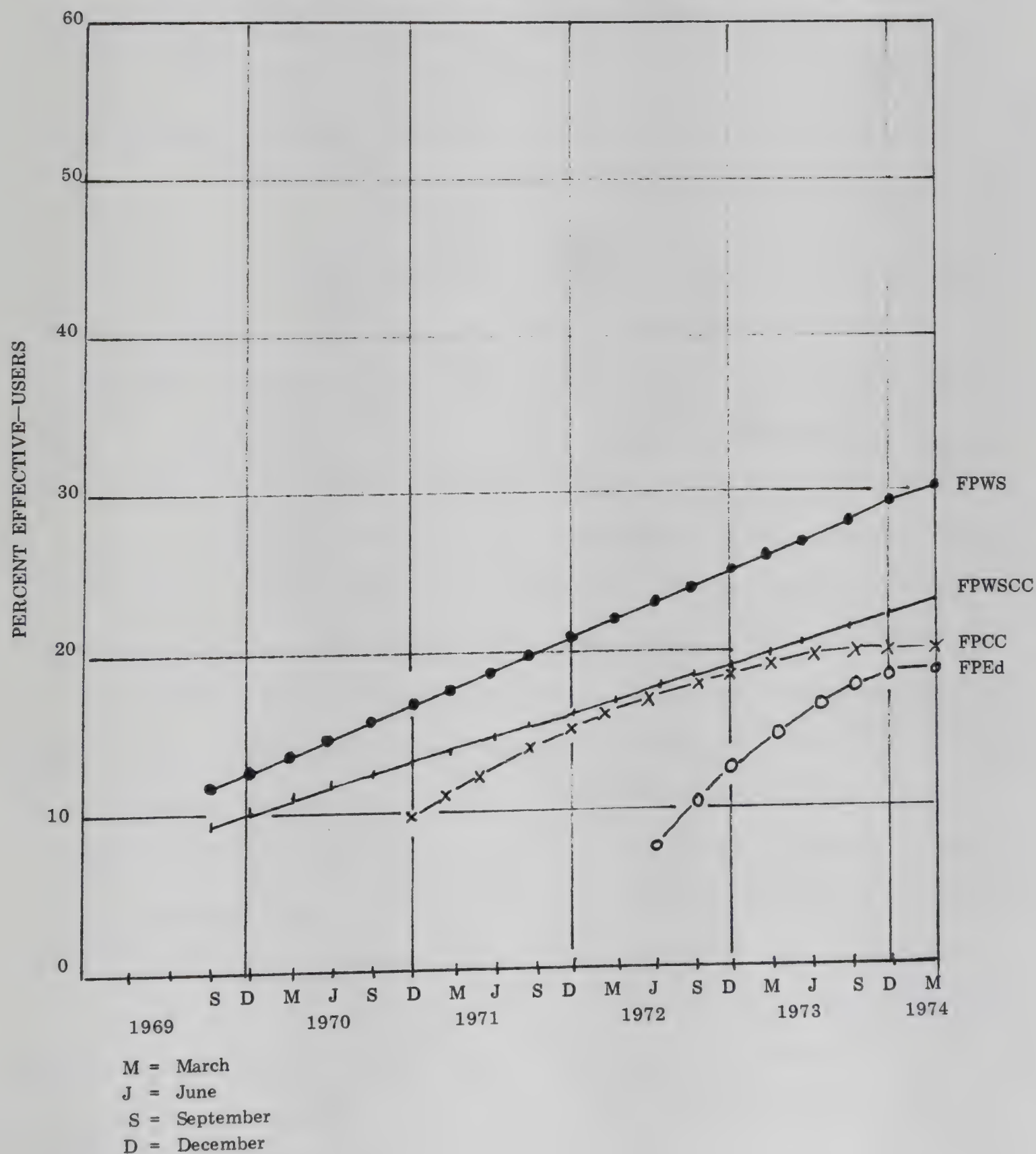
Fit of Quadratic Equations to Time Trends in Effective-User Rates
in the Experimental Groups

Cohort	Least squares estimates of terms			Proportion of Explained Variation R^2	Level of Signi- ficance of Quadratic Term
	Constant	Linear	Quadratic		
FPWSCC	8.54	0.82	0.00	.98	>.25
FPWS	10.84	0.91	0.01	.96	>.25
FPCC	7.87	1.81	-0.07	.90	<.05
FPED	4.36	3.12	-0.16	.98	<.05

Note: (same as for Table 2.2)

Figure 2.6

TRENDS IN EFFECTIVE-USER RATES IN EXPERIMENTAL GROUPS
(Smooth Curves Obtained by Fitting Quadratic Equations to Effective-User Rates)



differences. But for the start-up differences the rates of family planning probability would have indicated the greatest impact of the program in FPWS group followed by FPWSCC, FPCC and FPED groups in that order. This ranking is supported especially by the effective-user rates which take into account the differences in effectiveness of contraceptive methods which were lower in the groups with a later start of the program. Evidently the higher rates of acceptance and practice were achieved by more aggressively promoting the less effective contraceptive methods.

The Influence of Pre-Program Use on Program Acceptance

The data presented thus far have not taken into account pre-program contraception experience. Acceptors of program contraception are made up of three groups: (1) those who had used modern contraceptives, (2) those who had used traditional/indigenous methods of contraception and (3) those who had not used either modern or traditional methods of contraception. The first two groups substituted pre-program for program contraception during the program. Those instances in which program contraception replaced earlier use of modern methods have been considered a change of source even though this may have included a shift to more effective methods. All instances of a shift from earlier traditional/indigenous methods clearly indicated method-substitution. Presumably, greater demographic impact occurred with higher rates of new acceptance and lower rates of source= substitution.

Data on Pre-Program Contraception

Of the 26 villages covered by the Narangwal study 15 received family planning services while 11 did not. Continuing information on contraceptive practices was obtained in all 15 villages with services. Cross-sectional

surveys also were used to obtain information on family planning practices at two points in time in 1968-69 and in 1971-72. To measure pre-program practice of family planning the 1968-69 cross-sectional survey was used in the 11 villages that received no family planning and the 11 villages where services started in 1969 and 1970. For the additional 4 FPEd villages in which program activities started in 1972 the 1971-72 survey was used to measure pre-program contraception.

In the pre-program cross-sectional surveys information was obtained on whether, when and what method of family planning had been used. About 50 percent of women surveyed responded that they or their husbands had already practiced some kind of family planning (Table 2.5). Modern methods of contraception had been used by 17.6 percent of couples and the remaining 32.7 percent had used traditional and/or indigenous methods.

Table 2.6 shows the distribution and use rates of indigenous methods at the time of the first survey before project activities started. Safe period (based on local cultural beliefs that following menstruation the uterus is like a freshly plowed field waiting for seed and then slowly closes by mid-period), withdrawal and abstinence were the most commonly reported methods in current use. Only a few people out of the many who knew of indigenous medicines and herbs actually said they used them. A variety of home methods such as wasing, douche, sponge and simply squatting were considered useful but, in fact, seldom used. Many people knew about abortion but on this first survey we did not feel free to ask about use. Many people also knew about condoms from army experience but they were considered something to be used for venereal disease prophylaxis more than contraception. The national campaigns for IUDs and sterilization

Table 2.5

Distribution of Women, Prior Users and Program Users, in Villages
Covered by the Family Planning Service Program and
Those Not Covered by the Program

	Number of Villages	Number of Women	Number of Prior Users	Number of Program Users	Number of Prior Users Who Became Program Users	Number of Program Users Whose Prior Use Was Known
Villages With FP Services	15	2603	1287 (49.9%)	1674	743 (57.7%)	1207
Villages With No FP Services	11	1339	696 (52.0%)	-	-	-
TOTAL	26	3942	1983	1674	743	1207

* There were 1674 program users in all and on 1207 information on prior use was available. On the remaining 467 users information on their prior use was not available for reasons such as marrying and becoming eligible after the program started, immigrating after program started or not having been covered in the pre-program survey(s).

Table 2.6

Knowledge and Practice of Family Planning Prior to Project (First Survey 1968-69, Mutually Exclusive Percentages)

	Never Heard	Heard Only	Knows Use	Prior Use	Current Use
Non-Device Methods *	27	2	28	18	25
Indigenous Medicine and Herbs **	33	-	65	2	-
Home Methods **	64	-	23	8	5
Abortion	37	44	19	-	-
Device Methods ***	50	16	25	6	2
IUD	12	80	0	5	3
Oral	82	12	7	0	0
Sterilization	13	83	-	-	3

* Safe period, withdrawal, abstinence

** Wash, douche, sponge, get out of bed and squat or walk around a tree

*** Condom, foam tablet, cream, diaphragm

had produced a high level of awareness of these methods but relatively few people admitted that they had used them. As the project proceeded we found that prior use was actually greater than initially reported.

From Table 2.7 it is clear that the prior-use rates in the villages where FP services were offered and those where no FP services were offered were similar, 49.4 and 52.0 percent respectively ($\chi^2_{(1)} = 2.3$, $p = 0.15$). Among the four FP service cohorts the variation in the prior-use rates was slightly more, ranging from 46.4 to 51.2 percent but the differences were not statistically significant ($\chi^2_{(3)} = 3.6$, $p = 0.32$).

Table 2.7 also shows that pre-program use of modern methods was 17.6 percent for the entire area but varied greatly among the various village groups ($\chi^2_{(3)} = 65.9$, $p < 0.01$). The highest rate was 26.0 percent in FPED followed by 19.1 percent in FPWS, 18.1 percent in controls, while FPWSCC and FPCC had much lower rates, 11.7 and 11.9 percent. Modern contraceptives accounted for about one-half of prior contraception in FPED and over one-third in FPWS and control villages. The obvious reason is that these villages were selected to be as close as possible to PHCs because of the ethical consideration that we did not want to have study villages that had no access to child care. Since family planning was the main outreach activity of PHCs it is evident that they had made an impact in these villages. In the other two experimental groups modern contraception was used by only one-fourth of those who had practiced family planning with relatively greater use of traditional methods. It is apparent that pre-program levels of contraception would determine initial rates of substitution after program services started. A comparison of pre-program use of permanent, temporary and traditional methods of family planning for the four service groups is shown in Figure 2.7.

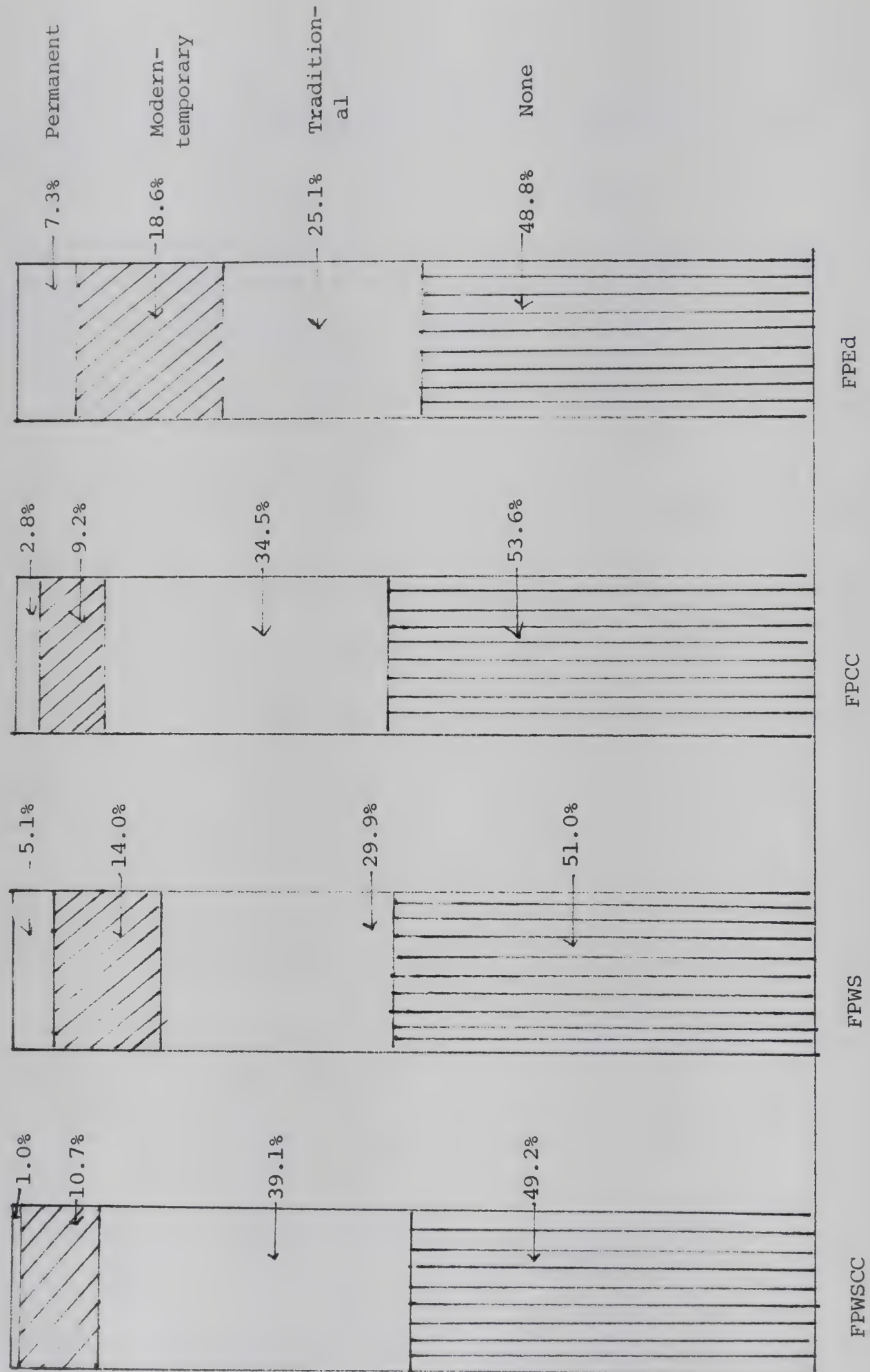
Table 2.7

Percent Prior-Users of All Methods and of Modern Methods
Among Women of Different Service and Non-Service Groups of Villages

Experimental Group	Number of Women	Number of Prior Users of any Methods	% Prior Users of any Methods	Number of Prior Users of Modern Methods	% Prior Users of Modern Methods
FPWSCC	693	352	50.8	81	11.7
FPWS	606	297	49.0	116	19.1
FPCC	612	284	46.4	73	11.9
FPEd	692	354	51.2	180	26.0
All FP Villages	2603	1287	49.4	450	17.3
All Non-FP Villages	1339	696	52.0	243	18.1
All Villages	3942	1983	50.3	693	17.6

Figure 2.7

Pre-Program Use of Permanent, Modern-Temporary and Traditional Methods Among Experimental Groups



A striking feature of pre-program contraception was the frequent use of combinations of methods as shown in Table 2.8. In FP service villages modern temporary methods were used by 4.0 percent of couples but these methods were used in combination with other methods by 10.6 percent. Similarly, permanent methods were used by 1.8 percent, but 2.3 percent used permanent methods after using other methods. Thirty-two percent of couples in all FP service villages had used only traditional methods with another 11 percent having used both modern and traditional methods.

Transition from Pre-Program to Program Contraception

Information on prior contraceptive practice was available on 2,603 couples in the 15 villages where family planning services were offered and on 1,339 couples in the 11 villages where no services were offered. In these two groups of villagers, 1,287 and 696 couples respectively reported that they practiced one or more methods of contraception prior to the program (Table 2.5).

For general analysis pre-program contraceptive use was grouped into four categories - permanent methods, modern temporary methods (same as program methods except Depo-provera), traditional methods and no method. Since no change was possible from pre-program to program use of permanent methods (vasectomy and tubectomy), only the remaining categories have been analyzed.

In the four service groups there were 1,181 pre-program users of temporary methods (traditional or modern) and 637 of these practiced contraception during the program, or a transition rate of 53.9 percent. Table 2.9 shows that transition from pre-program to program use was highest in FPWS and lowest in FPED (61.7 and 49.5 percent) probably related to the time of exposure to program activities.

Table 2.8
Pre-Program Use of Different Methods in FP-Service Villages and
Non-FP Villages

Method (s) Used Prior to Program	Use by Experimental Group											
	FPWSCC		FPWS		FPCC		FPED		FP-Service Villages		Non FP-Service Villages	
	No.	%	No	%	No.	%	No.	%	No.	%	No.	%
None	341	49.2	309	51.0	328	53.6	338	48.8	1316	50.6	643	48.0
T	271	39.1	181	29.9	211	34.5	174	25.1	837	32.2	453	33.8
M	15	2.2	25	4.1	9	1.5	55	7.9	104	4.0	51	3.8
MT	59	8.5	60	9.9	47	7.7	74	10.7	240	9.2	137	10.2
P	3	0.4	13	2.1	7	1.1	23	3.3	46	1.8	18	1.3
PT	2	0.3	6	1.0	6	1.0	9	1.3	23	0.9	17	1.3
PM	0	0.0	4	0.7	1	0.2	10	1.4	15	0.6	7	0.5
PMT	2	0.3	8	1.3	3	0.5	9	1.3	22	0.8	13	1.0
Total	693	100.0	606	100.0	612	100.0	692	100.0	2603	100.0	1339	100.0

Note: T,M,P denote traditional, modern reversible and permanent (irreversible) methods respectively and others are combinations of these.

Table 2.9

Percent Prior Users Who Became Program Users By Prior Method(s) and Experimental Group

Experi- mental Group	Prior-Use Methods	Number of Prior Users	Number of Users Who Became Program Users	Prior Use Status and Program Use	$\chi^2_{(2)}$	p- value
FPWSCC	None	341	134	39.2	} 25.3	<.005
	Traditional					
	Only	271	136	50.2		
	Modern	74	52	70.3		
FPWS	None	309	133	43.0	} 46.4	<.005
	Traditional					
	Only	181	92	50.8		
	Modern	85	72	84.7		
FPCC	None	328	113	34.5	} 28.4	<.005
	Traditional					
	Only	211	95	45.0		
	Modern	56	40	71.4		
FP-Ed	None	338	84	24.9	} 70.4	<.005
	Traditional					
	Only	174	64	36.8		
	Modern	129	86	66.7		
All FP Villages	None	1316	464	35.3	} 157.2	<.005
	Traditional					
	Only	837	387	46.2		
	Modern	344	250	72.7		

The most important finding from Table 2.9 is the relation between the probability of becoming a program contraceptive and the type of contraception used prior to the program. In all service villages only 35.3 percent of couples who had used no contraception earlier became contraceptors during the program as compared with 46.2 percent of couples who had used traditional methods and 72.7 percent of couples who had used modern temporary methods.

Transition from pre-program to program use showed progressive shifting to more effective methods. Table 2.10 shows the pattern of transition when program contraception is categorized in four groups: (1) non-use, (2) use of modern temporary, (3) permanent, and (4) modern temporary followed by permanent. To the latter three categories of program contraception, transitions were greatest when pre-program contraception included modern methods and transitions were least from those with no pre-program contraception experience. Patterns of transition to permanent methods are especially important. Persons who eventually used permanent methods were 24 percent of the total women. Of these, 36 percent had sterilizations before the program started, 33 percent shifted from modern methods, 16 percent shifted from traditional methods and 15 percent had no previously used family planning.

Extent of Substitution Among Program Contraceptors

Out of 1,207 program contraceptors 61.6 percent were prior users. In view of the high level of prior use of modern methods it is only to be expected that FPED would have the highest substitution rate, 70.5 percent ($\chi^2_{(1)} = 12.63, p < .01$) (Table 2.11) while FPWSCC, FPWS and FPCC cohorts had substitution rates of 59.3, 59.5 and 57.4 percent. Substitution from modern

Table 2.10

Transition from Prior Use to Program Use by Type of ContraceptiveMethod(s) in the FP-Service Villages

Prior Use of Methods	Non-Use of Program Methods*	Use of Program Methods			Total
		Modern (Temporary)	Permanent	Modern and Permanent	
None	852 (64.7)	401 (30.5)	44 (3.3)	19 (1.4)	1316 (100.0)
Traditional	450 (53.8)	317 (37.9)	47 (5.6)	23 (2.7)	837 (100.0)
Modern	94 (27.3)	195 (56.7)	31 (9.0)	24 (7.0)	344 (100.0)
Permanent	0 (0.0)	0 (0.0)	106 (100.0)	0 (0.0)	106 (100.0)

* Includes use of traditional and indigenous methods as well as non-use of any methods.

Table 2.11
Percent Program Users Who Were Prior Users by Experimental Group

Experimental Group	Number of Program Users*	Number of Program Users Who Were Prior Users of		% Program Users Who Were Prior Users of		
		Any Method(s)	Method(s)	Any Method(s) (Overall Sub)	Traditional/Indigenous Method (Sub of Method)	Modern Method(s) (Sub of Source)
FPWSCC	329	195	59	59.3	41.4	17.9
FPWS	328	195	103	59.5	28.1	31.4
FPCC	265	152	57	57.4	35.9	21.5
FPED	285	201	137	70.5	22.4	48.1
All FP Villages	1207	743	356	61.6	32.1	29.5
χ^2 (3)				13.0	29.2	77.1
p = value				<.005	<.005	<.005

* There are 1207 program users on whom information about prior use is available.

methods, which, was mostly a change of source of supply, was 29.5 percent. Differences between village groups were dramatic ranging from FPEd - 48.1 percent, to FPWS - 31.4 percent, FPCC - 21.5 percent and FPWSCC - 17.9 percent.

Program impact on fertility was presumably greater where the rate of substitution, especially source-substitution was lower. On this basis FPWSCC had the maximum impact in recruiting new cases, FPCC came next, followed by FPWS, while FPEd had considerably less impact. The shorter duration of program activities in FPEd obviously was related to the high levels of substitution. Since these villages started with the highest level of modern contraception they had not yet used up these prior users while the other villages were having to recruit persons who had been non-users. As indicated in Table 2. the rapid family planning achievements in FPEd can be explained largely by the fact that they benefitted from the highest pre-program rates with only 29.5 percent new recruitment and 22.4 percent method-substitution. FPWS and FPWSCC had identical rates of new recruitment (40.5 and 40.7 percent) but the rate of method-substitution in FPWSCC was higher (41.4 percent) than in FPWS (28.1 percent). Similarly, the FPCC cohort which had a shorter program duration and a lower acceptance level than FPWS had essentially similar rates of new recruitment (42.6 and 40.5 percent) and a higher rate of method-substitution (35.9 and 28.1 percent).

Sociodemographic Differentials in Pre-Program Contraception

Analysis of contraceptive practice in the various sociodemographic subgroups of the population before the program is especially important in indicating equity in coverage of population subgroups.

Five sociodemographic variables - religion-caste, education of husband, occupation of husband, age of wife and number of living children were included in the analysis.

1. Religion-Caste

Before the program contraceptive practice was least in scheduled Sikhs (Sch-Sikh, the lowest castes) and the highest in the Jat-Sikh and other caste groups. From Table 2.12 it may be seen that pre-program use of family planning was 45.7 percent among Sch-Sikhs, 50.9 percent among Jat-Sikhs and 54.4 percent among others. The main reason for these differences was differential use of modern temporary and permanent methods with differences that were highly significant. The use of traditional methods was not significantly different in the three groups.

2. Education of Husband

Husband's education was also related to practice of family planning (Table 2.13), with non-users ranging from 51 percent with zero education to 30 percent for those with 11 or more grades of education. These highly significant differences were entirely in the use of modern contraception. For both traditional and permanent methods practice rates were not significantly different between educational groups.

3. Occupation of Husband

Pre-program contraception also differed by occupational group ranging from 55 percent for service and others, to 50 percent for farmers and 46 percent for laborers. These categories paralleled the educational and caste distributions. As can be seen from Table 2.14, use of traditional methods was almost equal in the four groups.

Table 2.12

Distribution of Couples by Religion-Caste and Methods Used Prior to Program

E-PROGRAM E OF METHODS	RELIGION-CASTE									
	JAT-SIKH		SCH-SIKH		OTHERS		TOTAL		χ^2 (2)	P value
	No.	%	No.	%	No.	%	No.	%		
ne	626	49.1	486	54.3	191	45.6	1303	50.4	10.1	.006
additional	386	30.3	294	32.9	151	36.0	831	32.1	5.1	.080
dern	199	15.6	92	10.3	57	13.6	348	13.5	12.9	<.005
rmanent	63	5.0	23	2.6	20	4.8	106	4.1	19.7	<.005
TAL	1274	100.0	895	100.0	419	100.0	2588	100.0		

Table 2.13

Distribution of Couples by Education of Husband and Methods Used Prior to Program

PRE-PROGRAM USE OF METHODS	EDUCATION OF HUSBAND (Grade passed)											
	0		1-5		6-10		11+		Total		$\chi^2_{(3)}$	P value
	No.	%	No.	%	No.	%	No.	%	No.	%		
None	729	51.5	148	50.3	286	45.8	25	30.1	1188	49.1	17.9	<.001
Traditional	473	33.3	95	32.3	204	32.7	22	26.5	794	32.8	1.8	.62
Modern	151	10.7	37	12.6	116	18.6	30	36.1	334	13.8	57.7	<.001
Permanent	64	4.5	14	4.8	18	2.9	6	7.3	102	4.2	4.9	.14
TOTAL	1417	100.0	294	100.0	624	100.0	83	100.0	2418	100.0		

Table 2.14

Distribution of Couples by Occupation of Husband and
Methods Used Prior to Program

PRE-PROGRAM USE OF METHOD	OCCUPATION OF HUSBAND											
	Farming		Labor & Tending Cattle		Service		Other		Total		$\chi^2_{(3)}$	P value
None	498	50.2	341	54.0	165	45.1	202	44.7	1206	49.4	10.5	.013
Traditional	317	31.9	221	35.0	102	27.9	157	34.7	797	32.6	6.5	.092
Modern	128	12.9	54	8.5	78	21.3	78	17.3	338	13.8	37.1	<.005
Permanent	50	5.0	16	2.5	21	5.7	15	3.3	102	4.2	9.3	.020
Total	993	100.0	632	100.0	366	100.0	452	100.0	2443	100.0		

4. Age of Wife

Age of wife at the time of the baseline survey was an extremely powerful indicator of prior use (Table 2.15). Pre-program contraceptive practice was least in women under 25 years of age - 41.5 percent. The highest practice rate was in 24-34 year old women - 56.9 percent, and half of women over 35 had been prior users. Again, modern temporary methods showed the greatest differentials (18 percent in the 25-34 year group vs 12 percent in the other two groups). The use of permanent methods increased progressively with age but no differences were found in the use of traditional methods.

5. Number of Living Children

The direct association between number of children at the time of the pre-program survey and prior practice of family planning was more significant than any of the other variables. Thirty-eight percent of couples had less than 3 children, 45 percent had 3-5 children, and the remaining 16.7 percent had more than 5. Pre-program contraception was least (38 percent) among women who had less than 3 children as compared with 58 percent for the other two groups (Table 2.16). For the first time a significant difference in practice of traditional methods was found increasing from 26 percent to 37 and 34 percent. Use of permanent methods increased from 1 percent for less than 3 children, to 5 percent for 3-5, and 10 percent for 6+ children. Prior use of modern temporary methods which presumably includes the concept of spacing was maximum in the 3-5 children group and least in the less than 3 group.

Table 2.15

Distribution of Couples by Age of Wife at the Beginning of the Program
and Methods Used Prior to the Program

PRE-PROGRAM USE OF METHODS	AGE OF WIFE										
	< 25		25-34		35+		Total		$\chi^2_{(1)}$	p value	Mean Age
	No.	%	No.	%	No.	%	No.	%			
One	314	58.5	373	43.1	460	49.8	1147	49.3	31.4	<.005	32.3
Traditional	157	29.2	297	34.3	298	32.2	752	32.3	3.9	.160	32.8
Modern	63	11.7	153	17.7	109	11.8	325	14.0	15.8	<.005	31.6
Permanent	3	0.6	42	4.9	56	6.1	101	4.3	25.9	<.005	35.8
Total	537	100.0	865	100.0	923	100.0	2325	100.0			

Table 2.16

Distribution of Couples by Number of Children Living at the Beginning of
the Program and Methods Used Prior to the Program

PRE-PROGRAM USE OF METHOD	Living Children									Mean No Living
	<3		3-5		6+		Total		χ^2 (2) p value	
	No.	%	No.	%	No.	%	No.	%		
None	551	61.9	435	41.6	161	41.5	1147	49.3	91.3 <.005	2.90
Traditional	234	26.3	385	36.8	133	34.3	752	32.3	24.9 <.005	3.65
Modern	99	11.1	170	16.2	56	14.4	325	14.0	10.5 .005	3.63
Permanent	6	0.7	57	5.4	38	9.8	101	4.3	59.6 <.005	5.05
Total	890	100.0	1047	100.0	388	100.0	2325	100.0		

Sociodemographic Patterns in Transition from Pre-Program to Program Contraception and Clues for Targeting of Program Efforts

Sociodemographic transition patterns for pre-program users of traditional and modern temporary methods are presented in Table 2.17. In general, the very important finding is that patterns of transition were equal in the various social and demographic subgroups of the population. Transition from modern method use occurred equally regardless of religion-caste, education of husband, occupation of husband, age of wife or number of living children (Table 2.17). Transition from traditional method use also did not exhibit significant association with any social and demographic status variables except the age of wife. Couples with wives in the age group 35+ had a lower transition rate from non-use to program use.

A major purpose of analyzing pre-program differentials in family planning practice and program contraception was to identify subgroups on whom program efforts could be concentrated. These data give a quantitative base for judging probable patterns of impact. If the main objective is to increase acceptance rapidly, it will be easier to reach couples who had previously used modern methods of contraception, then pre-program users of traditional/indigenous methods and finally non-users. If, on the other hand, the objective is to equalize contraceptive practice among the various subgroups of the population, these results show that integrated services can effectively provide coverage to those subgroups which had been underserved before the program such as scheduled castes, lower educational levels, laborers, younger women and women with fewer living children.

Table 2.17

Socio-Demographic Differentials in Transition from Pre-Program to
Program Practice of Contraception

Socio-Demographic Groups	Traditional Methods			Modern Temporary Methods		
	No. Pre-Program Users	No. Shifted to Program Mod.Methods	Percent	No. Pre-Program Users	No. Shifted to Program Sources	Percent
Religion-Caste:						
Jat-Sikh	386	174	45.1	199	144	72.4
Sch-Sikh	294	139	47.3	92	70	76.1
Others	151	70	46.4	57	41	72.0
	$\chi^2_{(2)} = 0.33$ p = .8504			$\chi^2_{(2)} = 0.51$ p = .7760		
Education of Husband:						
0	473	210	44.4	151	118	78.2
1-5	95	46	48.4	37	22	59.5
6-10	204	105	51.5	116	84	72.4
11+	22	11	50.0	30	23	76.7
	$\chi^2_{(3)} = 3.07$ p = .3916			$\chi^2_{(3)} = 5.67$ p = .1361		
Occupation of Husband:						
Farming	317	149	47.0	128	95	74.2
Labor	221	109	49.3	54	40	74.1
Service	102	48	47.1	78	51	65.4
Other	157	68	43.3	78	64	82.1
	$\chi^2_{(3)} = 1.33$ p = .7224			$\chi^2_{(3)} = 5.64$ p = .1378		
Age of Wife:						
25	157	90	57.3	63	46	73.0
25-34	297	161	54.2	153	122	79.7
35+	298	98	32.9	109	73	67.0
	$\chi^2_{(2)} = 36.70$ p < .010			$\chi^2_{(2)} = 5.47$ p = .0688		
Number of Living Children:						
3	234	107	45.7	99	70	70.7
4-5	385	185	48.1	170	127	74.7
6+	133	57	42.9	56	44	78.6
	$\chi^2_{(2)} = 1.14$ p = .5731			$\chi^2_{(2)} = 1.21$ p = .5523		

Influence of Attitudes Toward Family Planning and Beliefs Regarding Child Survival on the Practice of Family Planning

The research objectives included specific attention to attitudinal influences on family planning practice. Associations have been shown between certain attitudes about family planning or beliefs regarding child survival and contraception behavior. These results do not fit the general opinion that attitudes lead to practice. The process seems more complex and an effort has been made to test the possible causal relationships through sequential analysis.

Attitudes and beliefs were measured by verbal responses to a cross-sectional survey before the start of family planning services in all study villages. Respondents were followed with continuing recording of contraceptive use for about four years. (FPEd villages were excluded from this analysis because of the short period of observation)

Analyses were done on those women: (1) whose attitudes and beliefs were recorded in the first cross-sectional survey; (2) who were currently married at least until the second cross-sectional survey (about two years); (3) who were from those villages where family planning services were offered during the program; and (4) who had not practiced contraception up to the time of the first attitude-belief survey. There were 1,327 women who satisfied the above conditions.

Questions were asked about whether they approved of family planning and also whether they approved of family planning use by newly-wed couples. About 53.1 percent of women approved family planning, 29.5 percent disapproved, and 17.3 percent were uncertain. With regard to family planning for newly-wed couples 39.1 percent of women approved; 31.6 percent disapproved, and 27.7 percent were not sure.

Questions were asked to assess opinions about whether they thought there were more chances that children were surviving than 30 years ago and also whether they thought more children were dying. About 32.3 percent women stated that child survival had improved and 19.2 percent said it had deteriorated while 47.9 percent thought it remained the same or were uncertain about change. When the question was reversed and women were asked whether fewer or more children died now than before, the proportions were 29.4 percent answering as 'fewer', 25.6 percent answering 'more' and the remaining 45.0 percent were either uncertain or thought there was no change.

A question was asked about whether the wife had talked with her husband about family planning. About 51.0 percent of women stated that they had talked with their husband regarding family planning and the remaining 49.0 percent said they had not.

At the time when these attitudes and beliefs were obtained, all women included in the analysis had not used any method of family planning. Of the 1327 couples included in the present analysis, 72 (5.4 percent) accepted a permanent method through the program and 551 (41.5 percent) practiced a temporary method at some time during the four years of the program.

1. Approval of Family Planning

Approval of family planning had a slight effect on subsequent contraception behavior (Table 2.18). Among those who approved of family planning, 52.1 percent started to practice family planning some time during the program period. Among those who initially disapproved of family planning the proportion who subsequently started practicing was 45.4 percent. Of those who were uncertain about their attitude to family planning, only

Table 2.18

Distribution of Women by Their Pre-Program Response Regarding Attitudes
and Beliefs Towards Family Planning and About Child Mortality and Their
Contraceptive Behavior During Program

Pre-Program Response Regarding Attitudes and Beliefs		Accepted During Program		Did Not Accept Any Method During Program	Total
		Permanent Methods (Vasectomy or Tubectomy)	Temporary Methods(s) Only		
Approval of Family Planning	Approve	57 (8.1)	310 (44.0)	338 (47.9)	705 (100.0)
	Disapprove	11 (2.8)	167 (42.6)	214 (54.6)	392 (100.0)
	Uncertain	4 (1.7)	74 (32.1)	152 (66.1)	230 (100.0)
Approval of Family Planning for Newly-Wed Couples	Approve	44 (8.5)	237 (45.7)	238 (45.9)	519 (100.0)
	Disapprove	16 (3.8)	175 (41.8)	228 (54.4)	419 (100.0)
	Uncertain	11 (3.0)	131 (35.7)	225 (61.3)	367 (100.0)
	No Response	1 (4.5)	8 (36.3)	13 (59.1)	22 (100.0)
Chances of Child-Survival as Compared to 30 Years Ago	More chances	31 (7.2)	185 (43.1)	213 (49.7)	429 (100.0)
	Less chances	11 (4.3)	115 (45.1)	129 (50.6)	255 (100.0)
	Same chances	30 (4.7)	248 (39.0)	358 (56.3)	636 (100.0)
	or uncertain No Response	0 (0.0)	3 (42.9)	4 (57.1)	7 (100.0)
Less/More Children Die Now than Before	Less die	29 (7.4)	169 (43.3)	192 (49.2)	390 (100.0)
	More die	14 (4.1)	132 (38.8)	194 (57.1)	340 (100.0)
	Same as before	29 (4.8)	250 (41.8)	318 (53.3)	597 (100.0)
	or uncertain				
Communication with Husband About Family Planning	Talked /w husband	51 (7.5)	325 (48.0)	301 (44.5)	677 (100.0)
	Did not talk /w husband	20 (3.1)	224 (34.8)	399 (62.0)	643 (100.0)
	No Response	1 (14.3)	2 (28.6)	4 (57.1)	7 (100.0)

33.9 percent started contraception. The relationship with approval was especially strong among those who accepted permanent methods of family planning.

Table 2.18 indicates that of those who approved family planning for newly-wed couples 54.2 percent started practicing contraception during the program period while among those who disapproved, the contraceptive use rate was 45.6. Only 38.7 percent of those who expressed uncertainty practice contraception.

The three categories of 'approve,' 'uncertain,' and 'disapprove' usually are treated as falling on an ordinal scale with 'uncertain' in the middle. With great consistency in these data, however, the uncertain group has proved to be more negative than those who said they disapproved. These differences were statistically significant. The differences in contraceptive practice rates among those who approved and those who disapproved were marginally significant statistically but so many people who originally disapproved actually started to practice that the relationship does not seem particularly important.

2. Beliefs about child survival

The contraceptive practice rate was 50.3 percent among those who expressed the belief that chances of survival for children had increased over the past 30 years and 49.4 percent among those who said that the chances had decreased. Among those who were uncertain or who said the chances were the same the contraceptive practice rate was 43.7 percent (Table 2.18). The relationship seemed especially strong among those who accepted permanent methods of family planning.

When the question was turned around, however, and asked in terms of whether more or less children die, the results were less equivocal.

Contraceptive practice among those who believed that child mortality had gone

down was 50.8 percent followed by 46.7 percent among those who believed there was no change, and 42.9 percent among those who believed child mortality had increased. These differences were significant but, as with approval of family planning, over 40 percent of people who believe child mortality has increased still began to practice family planning.

3. Communication with Husband About Family Planning

A question that was a particularly good predictor of family planning practice was whether a woman had talked with her husband about keeping from getting pregnant. It is included with the attitudinal variables, even though it is actually behavioral because it presumably represents an important step in joint decision-making. We also consider this question to be our best indicator of the relative liberation or independence of women. Almost half of the women said they had talked with their husbands about family planning (Table 2.18). Of those who talked with their husbands, 55.5 percent started contraception during the program period while only 38.0 percent of those who did not talk accepted family planning.

4. Relative strengths of associations between attitudinal variables and contraceptive practice

The relative strength of these statistical associations was indicated by χ^2 tests. Communication with husband regarding family planning had the strongest association with subsequent contraception behavior and attitude toward practice of family planning by newly-wed couples was next. The difference in contraceptive practice among those who approved or disapproved of family planning was barely significant but the uncertain group had considerably less contraceptive practice than those who disapproved of family planning and this difference was highly significant. Couples who believed that there were

less chances of children dying than before were more likely to practice family planning and this association was significant. However, there were no significant association when the same question was asked in terms of whether more children were surviving. (Table 2.19)

Among those who accepted permanent methods, the most significant differences were found between those who talked with their husbands about family planning and those who did not ($\chi^2_1 = 12.7$); between those who approved or disapproved of family planning ($\chi^2_1 = 12.1$) and those who approved or disapproved of family planning for newly-wed couples ($\chi^2_1 = 8.4$). The difference in acceptance of sterilization among those who believed child mortality had improved or gotten worse was barely significant ($\chi^2_1 = 3.6$) while the difference was not significant when the question was asked in terms of survival.

Summary

Before the project started, both traditional and modern methods of family planning were being used in Narangwal villages. About half the couples had used some kind of contraception, and 17-18 percent had used modern methods. Village groups differed significantly in the use of modern contraception with the FPED group having the highest and FPWSCC the lowest pre-program use. Special note must be made of FPED data since detailed analysis showed that the rapid initial rise which matched the results in other groups of villages occurred largely because of the high level of contraceptive practice which had already been achieved as a result of the work of the government family planning program and their

Table 2.19

Relative Strengths of Association of Pre-Program Attitudes and Beliefs
With Contraception During Program

	Attitudinal Group	Proportion Started Contraception	N	χ^2 value 1 d.f.	p-value
Approval of Family Planning:	Approve	0.521	705	4.43 7.90	.038 .005
	Disapprove	0.454	392		
	Uncertain	0.339	230		
Approval of FP for Newly-wed Couples:	Approve	0.541	519	6.76 3.8	.009 .050
	Disapprove	0.456	419		
	Uncertain	0.387	367		
Chances of Child-survival as compared to 30 years ago:	More Chances	0.503	429	0.56 2.40	.468 .129
	Less Chances	0.494	255		
	Same Chances or Uncertain	0.437	636		
Child Mortality Less/More than Before:	Less Mortality	0.508	390	4.45 1.30	.038 .250
	More Mortality	0.429	340		
	Same Mortality or Uncertain	0.467	597		
Communication With Husband About FP:	Talked with Husband	0.555	677	40.95	<.005
	Not Talked with Husband	0.380	643		

uniquely high levels of affluence, literacy and high caste status.

Pre-program contraception differed by social status mainly in the use of modern methods but not in traditional methods. The prior use of modern methods was least among the Sch-Sikh (lowest) caste, laborers, those with lower education, where the wife's age was less than 25 years and those who had less than 3 children.

More than half of pre-program users became program contraceptors. Transition from pre-program to program use differed between service and was highest in FPWS and lowest in FPEd. When prior use was of modern methods there was much higher transition to program contraception. There were no significant differences in the percent of prior users who became program users according to religion-caste, occupation, education or number of children. The only significant difference was that there was greater transition to program use among younger couples.

Associations of program contraceptive practice were observed with attitudes towards family planning and beliefs regarding child survival. Communication with husband regarding family planning had the strongest association and attitude towards family planning by newly-wed couples was next. Couples who believed that there were less chances of children dying than before were more likely to practice family planning.

CHAPTER 3

HEALTH SERVICE ACHIEVEMENTS

Robert L. Parker and William A. Reinke

More than in any other currently available field research, the Narangwal Population and Nutrition Projects provided an unusual opportunity to measure the impact of varying inputs in terms of the quantity, distribution, time and cost of these inputs. As part of this measurement it proved necessary to separate the activities and costs associated with routine services from the extensive research, development, and training activities that were also going on in the project. In contrast to most studies which have been concerned primarily with results of interventions, we obtained data for detailed input-output-outcome analyses to establish the quantitative relationships between service inputs, family planning practice, health services utilization, decline in fertility and improvement in health status. This has also permitted analysis of the content, cost, and impact of the various service packages so that health planners using these data can select the most appropriate components to meet their specific objectives.

In this chapter we describe service inputs in each experimental group in terms of the numbers of service contacts provided by the project, and the amount of care received from outside the project. The use of health

services is then related to predisposing socioeconomic characteristics of individuals and their families as well as specific attitudes and beliefs already shown to be important determinants of family planning use. Finally the impact of the health services on selected attitudes, beliefs and health status indicators is demonstrated. In subsequent chapters service contacts are related to outcome measures to ascertain the impact of these services on family planning use and fertility. In addition, cost and time measures of service inputs are presented in Chapter 6 to demonstrate the efficiency of the different service combinations, especially in terms of their cost effectiveness. Examination of the evidence for the equitable distribution of services among population subgroups is also discussed within the overall considerations of equity in Chapter 6.

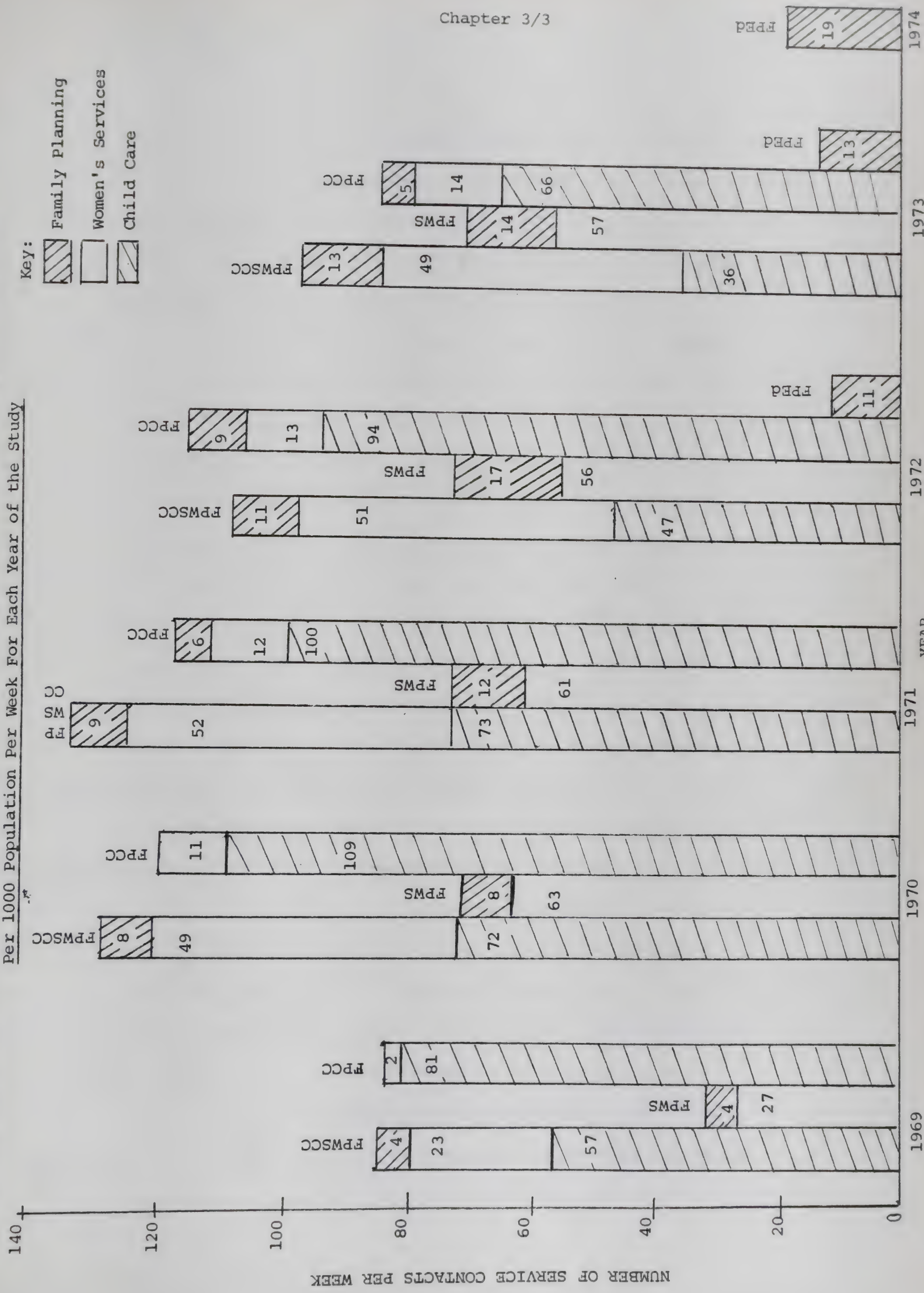
Service Contacts

Detailed individual patient or service records yielded information about services that spanned the full life of the project. The recorded service contacts gave an indication of the volume of home or clinic visits provided per week per 1000 population. Figure 3.1 summarizes the contacts made by all staff in FPWSCC, FPWS, and FPCC villages from 1969 through 1973 and in FPED villages from mid-1972 to early 1974.

In the villages with health services it can be seen that services were being built up in 1969 and reached a peak volume in 1970-71, then except for FPWS, total service contacts declined in 1972-73. In the FPED villages the volume of recorded service contacts per week was still expanding by the end of the project.

Explanations for some shifts in total volume of services can be

Average Number of Recorded Service Contacts Made By All Staff Working in Each Experimental Group



found when specific service contacts are examined. From 1970 on, the number of service contacts per week per 1000 population for women's services was quite constant in each of the experimental groups providing these services, ranging from 56 to 63 in FPWS, 49-52 in FPWSCC, and 11-14 in FP (mainly pregnancy surveillance visits in the latter villages). In addition, the number of recorded family planning contacts increased steadily from 4 per week in 1969 to 13 per week in 1973 in FPWSCC, from 4 in 1969 to 17 in 1972 in FPWS, from 6 in 1971 to 9 in 1972 in FPCC, and from 11 in 1972 to 19 in 1974 in FPEd. The only declines in family planning service contacts occurred in 1973 in FPWS and FPCC where they came down to 14 and 5 per week respectively.

The major shifts in total service contacts were almost entirely due to changes in the volume of children's services. In FPWSCC villages a very significant decline in children's service contacts occurred between 1971 and 1972 when they dropped from 73 per week to 47. This decline was maintained in 1973 when such service contacts numbered 36. After children's services had been developed in these villages a deliberate decision was made to simplify them in order to make them more replicable in a national program. Service contacts that were empirically found to be less essential were gradually eliminated starting in mid-1972. The main reduction was in the frequency of surveillance contacts during the child's first year of life. In the FPCC villages there was little decline in children's services between 1970 and 1972 (109 to 94 service contacts), but a major decrease in 1973 when service contacts came down to 66 per week. This change came after the completion of the overlapping nutrition project in 1973 when the decision was made to adjust the frequency of children's service visits.

in these villages closer to those in FPWSCC. However, some differences were deliberately maintained between the frequency of children's service visits in FPCC and FPWSCC in order to define carefully the relationship of surveillance visits to infant mortality (Nutrition Monograph).

Most of the service contacts were provided by FHW's and FPE's. FHW's were responsible for 90 to 95 percent of all children's and women's health service contacts. The remaining contacts were almost all referrals to physicians for complicated or emergency cases. Similarly, for family planning services doctors provided only 5-10 percent of all contacts. The distribution of other family planning contacts varied considerably from one experimental group to the next with FPW's (male workers) averaging about 20 percent of the family planning contacts in FPWSCC, 35 percent in FPWS, 60 percent in FPCC, and 5-10 percent in FPEd. FHW's or FPE's provided the remainder of the family planning contacts ranging from an average of 30-35 percent in FPCC to 80 percent in FPEd.

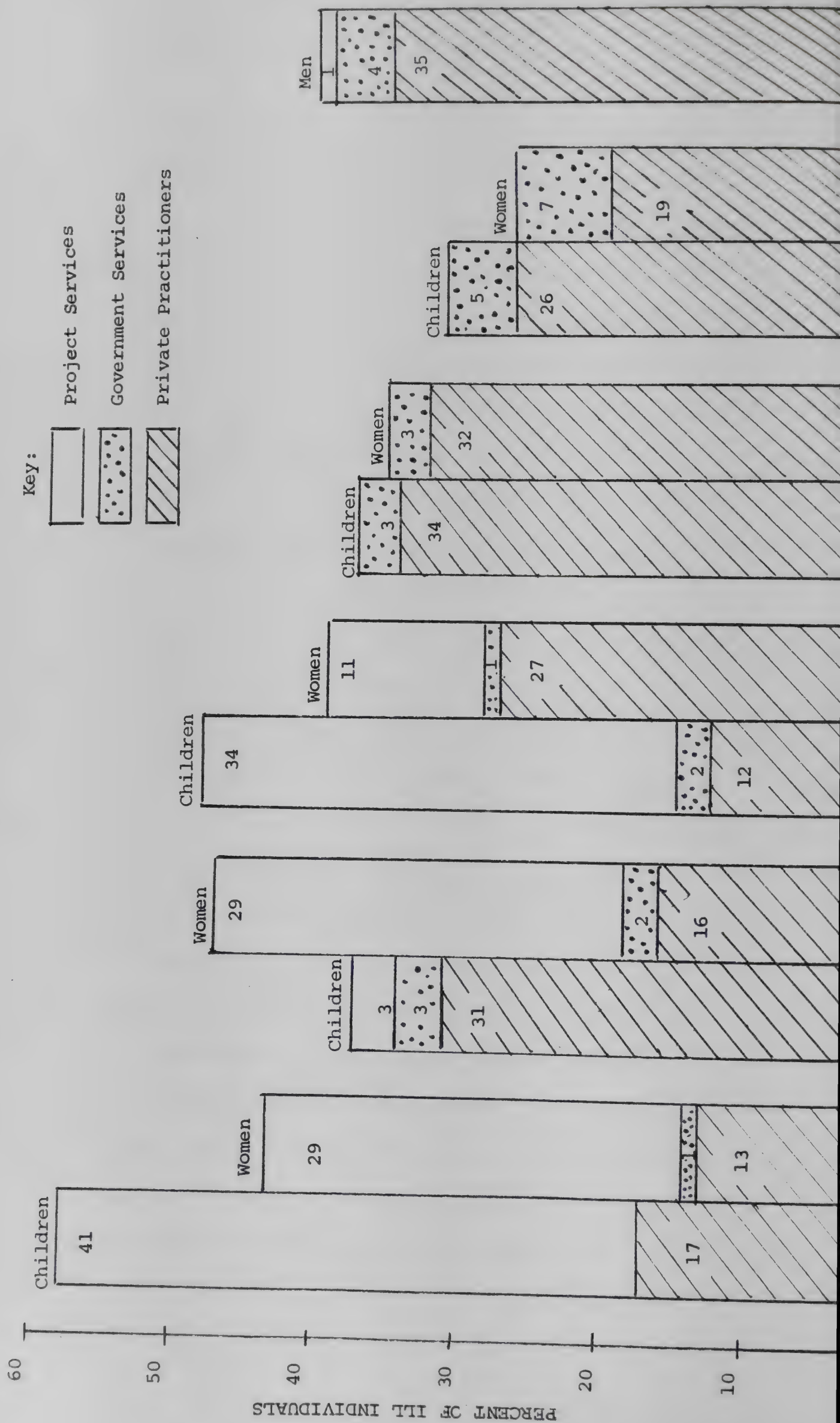
Use of Non-Project Services

In 1973 and 1974 sample household surveys estimated the prevalence of illnesses in the study and control villages based on recall of illness episodes over the two week period preceding the interview. During this two-week period, 56 percent of children under 3 years, 30 percent of children from 3 to 15 years, 50 percent of women and 27 percent of men were reported to have been sick. These two week prevalence rates did not significantly differ among the experimental groups.

The survey also determined what proportion of individuals had received some form of health care for their illnesses and identified the source of such care. In Figure 3.2 data are presented for women and children (0-14) separately

Figure 3.2

Percent of Ill Individuals Receiving Treatment From Different Sources of Care
In Each Experimental Group - 1973-1974



for each experimental group and for men in all experimental groups combined since they were almost totally excluded from project services. Almost 60 percent of the ill children in the FPWSCC villages and about 50 percent in FPCC received some type of care, while only 30 to 40 percent of ill children received care in control villages or project villages that had no children's services. Although project services were concentrated on children under three in all villages, FPWSCC provided more services than FPCC to children who were three through fourteen years of age. The percent of ill women who were treated ranged from 26 percent in control villages, 35 percent in FPEd, 38 percent in FPCC, 42 percent in FPWSCC, to 47 percent in FPWS. This contrasts with 40 percent of all men who received some kind of treatment.

Project services were primarily responsible for the better coverage of children in FPWSCC and FPCC villages, where our staff accounted for over two-thirds of the care provided. However, alternate sources of care, primarily indigenous private practitioners, continued to be used by one-third of the children illustrating the continuing influence of these traditional sources of care in spite of effective and easily accessible project services. In comparison with control and FPEd villages, project services for children in childcare villages replaced about one-half of the care usually received from other sources.

The effects of project services on overall use of services by women in FPWSCC and FPWS were similar to the effects observed on children's services. About 30 percent of ill women received care from the project in both of these experimental groups and this care made up between 60 and 70 percent of the total care received. Again, the use of other sources

of care was about half of the level seen in control and FPED villages. The provision of some care by the project to ill women in FPCC (mostly symptomatic treatments to maintain rapport) produced an intermediate picture, but the small amount of project child care services in FPWS villages did not modify the pattern of use of other sources of care.

Men obtained more services outside the project than women in villages without access to project care. This was especially true in control villages and was probably related to the greater mobility of men who could visit nearby market towns or cities where large numbers of private practitioners were available. Because of the greater prevalence of illnesses among women, however, the actual numbers of consultations by men and women were similar. Where women's services were provided by the project the total utilization rates for women were slightly greater than for men.

Government health centers provided little care in any of the villages. The greatest amount of treatment by government sources of care was in the control villages where 5 percent of ill children and 7 percent of ill women used the primary health center which was located within 1 to 3 kilometers of these villages. In contrast, private practitioners, most of whom had no formal training, provided 80-90 percent of the care of illness in villages without project services.

Relationship Between Intervening and Exogenous Variables and Health Service Use

In Chapter 2 several predisposing factors were shown to be associated with family planning practice. Some of these, such as age of women

and caste, would intuitively be identified as probably also affecting the use of health services. Demographic or socioeconomic characteristics are known to strongly influence a wide range of behaviors. However, a second set of predisposing factors which were related to contraceptive use included attitudes towards family planning, beliefs about child death and talking with husbands about family planning. These would not appear initially to be important direct determinants of health service utilization. One might hypothesize, however, that they could have indirect links to use of services via some general characteristics such as modernization or willingness to change.

In any case, as the first step in clarifying the relationship between health services and family planning practice, it was felt that it would be important to identify the extent to which variables that influence family planning also affect use of health services. These factors would then have to be controlled for when analyzing links between services and family planning.

Two cross-sectional surveys (SUR) measuring socioeconomic characteristics, attitudes and beliefs of women in the study population (SUR₁ ~ 1969 and SUR₂ ~ 1971) permitted a two-stage analysis. SUR₁ measured initial socioeconomic status, attitudes and beliefs and SUR₂ measured attitudes and beliefs after two to three years of project services. We therefore looked first at initial characteristics (predisposing factors) as they related to subsequent services in 1969 and 1970 (SUR₁ → Services_{69, 70}).

We then measured the change in attitudes and beliefs between the two cross-sectional surveys and related this to use of services during the three year interval, 1969-1971 ($\text{Services}_{69-71} \rightarrow \Delta \text{SUR}_{1 \rightarrow 2}$).

The Effect of Predisposing Factors

1. Women's Illness Services (WILL)

A review of the many tabulations relating predisposing variables to illness care of women in 1969 and 1970 revealed that:

- a. the analysis was meaningful only in the FPWSCC and FPWS groups of villages which had all the women's services available;
- b. there was no evidence of complex interaction effects between the various predisposing factors; and
- c. although overall utilization of services increased between 1969 and 1970, the basic relationships of predisposing factors to service remained unchanged.

Analysis of 1969 service information showed that 54 percent of married women between 15-49 years of age utilized illness care services at least once during the year. In the FPWS cohort the utilization rate was 55 percent, while the FPWSCC rate was 54 percent. Those under the age of 35 had a 55 percent utilization rate, while older women had a 52 percent utilization rate. Neither of these differences was statistically significant. This finding, coupled with the evident absence of interaction effects, led to a series of one variable at a time analyses on AB and SE factors in order to provide relatively large numbers of observations for analysis.

Results are summarized in Table 3.3. All but the RCAST variables proved to be statistically significant. Although not significant, there

Table 3.3

ANALYSIS OF AB-SE EFFECTS WITH RESPECT
TO WOMEN'S ILLNESS CARE IN 1969

Factor		n	% with Service	Significance
APPR	Disapproves	322	53.4	$\chi^2_2 = 8.59$
	Uncertain	186	45.7	(p < .025)
	Approves	496	58.1	
TALK	No	475	50.7	$\chi^2_1 = 4.45$
	Yes	453	57.6	(p < .05)
DIE	More	288	47.2	$\chi^2_2 = 7.57$
	Uncertain/Same	543	54.1	(p < .025)
	Less	303	58.4	
POSSES	<2 Items	631	51.0	$\chi^2_1 = 7.58$
	≥2 Items	373	59.8	(p < .01)
LAND	No	475	50.5	$\chi^2_1 = 5.02$
	Yes	453	57.8	(p < .05)
RCAST	Low	392	50.3	--
	High	742	55.3	

was an indication that nonscheduled (high) castes had a somewhat higher rate of utilization than scheduled (low) castes. (In this analysis RCAST was a dichotomous variable with all high caste Sikhs and Hindus lumped together and all low castes combined without regard to religion.) Other differences were in the anticipated direction. For example, those who expressed approval of family planning had a relatively higher services utilization rate than those who expressed disapproval. However, individuals who were "uncertain" about family planning were using services the least, indicating they are probably a special group of individuals whose vague response may hide a more negative attitude to use of services than overt disapproval of family planning. Beliefs about child deaths were linearly related to use, with those believing more die now using services less than those believing less die now. Individuals who were uncertain or said the same die now as before used services between the extremes. Finally, women who talked more with their husbands about family planning, had a greater number of possessions, or whose families owned land were more likely to use services.

In 1970, the overall utilization rate rose to 69 percent, an increase of 16 percent over 1969. The increase was remarkably similar in all population subgroups, none of the change differences reaching the 5 percent level of significance. The net result of the uniform increases in utilization was that AB and SE differences from 1969 were maintained in 1970.

2. Women's Other Services (WOTH)

The proportion of married women between 15-49 years of age receiving other care in 1969 was 76 percent. Unlike the pattern for illness care, significant differences were noted by cohort and age. Younger women

and those in the FPWSCC cohort had higher service rates. Subsequent analysis of the AB and SE variables was accordingly conducted separately by age group and cohort.

This analysis (Table 3.4) yielded three findings of significance:

- a. Younger women in the FPWS cohort who were uncertain regarding the DIE belief had a higher service use rate than was generally associated with that cohort and age group; otherwise this belief was unrelated to use of women's other care services.
- b. In contrast, uncertainty about APPR was associated with a relatively low service use rate among almost all groups of women, but was statistically significant only for older women in FPWSCC.
- c. Talking with husband (TALK) was associated with an especially high service rate among older women in FPWSCC.

An important negative finding was that unlike their effect on patient initiated illness care, socioeconomic differences did not have any significant effect on utilization of other care services in 1969. It is possible that these services which were project initiated were able to effectively overcome any initial socioeconomic barriers to utilization. In other words, considerable equity was achieved in the provision of project initiated women's services, a finding explored in greater depth in Chapter 6.

Use of other care increased overall in 1970 by a scant 3 percent. The increase was much larger, however, among younger women, especially in FPWS, reaching 90 percent coverage in 1970. The analysis shows only one significant SE difference in service level in 1970 that was not seen in 1969. In that case we find that for women under 35 in FPWS nearly 95

Table 3.4

SUMMARY OF SIGNIFICANT AB-SE EFFECTS
WITH RESPECT TO OTHER CARE IN 1969

Factor		n	% with Service	Significance
Total Population		1,134	75.9	
FPWSCC		612	81.0	$\chi^2_1 = 18.66$
FPWS		522	69.9	($p < .001$)
<35		626	78.1	$\chi^2_1 = 3.82$
>35		508	73.2	($p \approx .05$)
<hr/>				
FPWS - UNDER 35				
DIE	More	62	66.1	$\chi^2_2 = 6.77$
	Uncertain/Same	132	79.5	($p < .05$)
	Less	105	66.7	
<hr/>				
FPWSCC - OVER 35				
APPR	Disapprove	93	80.6	$\chi^2_2 = 6.37$
	Uncertain	57	64.9	($p < .05$)
	Approve	117	82.1	
TALK	No	148	74.3	$\chi^2_1 = 5.23$
	Yes	94	87.2	($p < .05$)

percent of low caste women received services, compared with 87 percent of high caste women. This probably reflects a concerted effort to reach the low caste women with these services, based on the assumption that they were in greater need of health care and family planning.

In general, age differences affected use of services more than AB-SE differences. This is particularly true for levels of other care services which showed a striking reduction from 1969 to 1970 in use of services by older women in FPWSCC in contrast to the increase during that period in service levels for FPWS women under 35. This was undoubtedly a result of the increasing emphasis between 1969 and 1970 on children's services and family planning in FPWSCC and services to younger women and family planning in FPWS, deliberately focussing attention away from older women. This program decision was made when it became evident that the family health workers especially in FPWSCC were overloaded with tasks and a deliberate reallocation of time was necessary.

3. Average Number of Visits Among Users of Women's Services

In addition to determining the percentage of women utilizing illness care and other care services the volume of such use was examined. In Table 3.5 the latter findings are summarized by experimental group for 1969 and 1970 and by age groups in the FPWS villages under other care. The average number of illness care visits per woman using such services in 1969 was 4.0 in FPWSCC villages and 5.1 in FPWS villages. The difference between the two experimental groups was statistically significant in 1969 and became even greater as the average visits increased more rapidly in FPWS villages between 1969 and 1970 than in FPWSCC.

Table 3.5

AVERAGE NUMBER OF VISITS OR CONTACTS
AMONG WOMEN WHO UTILIZED WOMEN'S SERVICES IN 1969 AND 1970

Type of Visit	Experimental Group	Average No. of Visits		Increase
		1969	1970	
WILL	FPWSCC	4.0 }*	7.7 }**	3.7
	FPWS	5.1	10.8	5.7
WOTH	FPWSCC	4.0	5.4 }*	1.4
	FPWS	4.1	5.9	1.8
	FPWS <35	4.2	6.1 }*	1.9
	>35	3.9	5.5	1.6

*Difference greater than 2 standard errors.

**Difference greater than 4 standard errors.

The average number of contacts per woman receiving other care was almost identical in both experimental groups in 1969. By 1970 women in FPWS averaged 5.9 contacts compared to 5.4 per woman in FPWSCC, a difference that was statistically significant. Finally, age did not have any significant effect on average visits per woman except in 1970 for other care in FPWS villages. Women under 35 averaged 6.1 contacts compared with 5.5 contacts for women 35 and over.

4. Children's Illness Care (CILL)

This analysis was limited to those experimental groups that provided child care, FPWSCC and FPCC, and involved mainly the family initiated clinic contacts. Examining the 1969 data first (Table 3.6) we found that for women with children of any age, about 67 percent had children who received curative services in the village clinics. There were significant differences in coverage of all children between the experimental groups (75 percent for FPWSCC and 58 percent for FPCC). This was mainly due to the design of services in FPCC which concentrated on care of children under 3 using frequent home visits. Among women with any children under 3, 79 percent received clinic care while 53 percent of women with children over 3 took their children to the clinic in 1969.

The relationship of initial attitudes and socioeconomic characteristics to use of children's illness care (clinic) services in 1969 are summarized in Table 3.6. Unlike the effect on women's illness care services, the variables of owning land or having more modern possessions were not associated with significant differences in use of children's services. Caste was also not related to variations in service use. Among the measures

Table 3.6

ANALYSIS OF AB-SE EFFECTS WITH RESPECT TO CHILDREN'S ILLNESS
CARE IN CLINICS IN 1969

Factor		n	% with Service	Significance
Total Women		1,004	66.9	
FPWSCC		537	74.7	$\chi^2_1 = 31.3$
FPCC		467	58.0	(p < .001)
Age of Children	Any <3	537	78.7	$\chi^2_2 = 73.1$
	Only ≥ 3	467	53.3	(p < .001)
APPROVE	Disapproves	283	73.9	$\chi^2_2 = 12.9$
	Uncertain	170	57.6	(p < .001)
	Approves	551	66.2	
TALK	No	447	66.0	--
	Yes	551	67.7	
DIE	More	263	59.3	$\chi^2_2 = 10.8$
	Uncertain/Same	450	71.3	(p < .005)
	Less	291	67.0	
POSSES	<2 Items	526	66.5	--
	≥ 2 Items	478	67.4	
LAND	No	445	67.6	--
	Yes	507	66.9	
RCAST	Low	370	66.2	--
	High	622	67.4	

of attitudes and beliefs, approval of family planning and beliefs about child deaths were associated with significant differences in use of services. Interestingly, although the lowest utilizers of services were the children of women who were uncertain about family planning, the disapprovers' children used services more than approvers, possibly indicating that disapprovers had more children. Women who believed more children die now than before had children who used services significantly less than women who were uncertain or said less die now. Talking with their husbands about family planning seemed to make no difference in use of children's services. In spite of major differences in service patterns, analyses carried out for each age group in the separate experimental groups showed similar associations of these predisposing variables and use of clinic services.

Use of children's illness care (clinic) services in 1970 rose only slightly to 69 percent. Differences in use by age of the children remained basically unchanged, but the difference between experimental groups diminished, with the rates being 72 percent in FPWSCC and 65 percent in FPCC. The differences in use related to the AB and SE variables were basically similar to 1969.

5. Children's Other Services (COTH)

These services were specifically designed for children under 3 years of age; therefore only women with children in this age group were included in this part of the analysis. Since the services were worker initiated, over 91 percent of these women had children who received this type of care. Coverage in the two experimental groups was quite similar (FPWSCC = 90 percent and FPCC = 93 percent), and socioeconomic character-

istics, attitudes and beliefs had at best only small effects on utilization rates. In 1970 overall use was almost the same at 92 percent and the relationship with SE and AB variables were for all practical purposes unchanged.

6. Average Number of Service Contacts in Clinics and Homes among Users of Children's Services

In Table 3.7 the average annual number of service contacts made with the children of women who used the project's children's services during 1969 through 1971 is summarized. In this table use in the two experimental groups is presented separately. In addition use has been related to the two attitude and belief variables to determine whether variations in the number of visits per user are related to attitudes and beliefs in a fashion similar to the relationship of attitudes and beliefs to absolute percent of women with children covered by services mentioned above.

The average number of illness care (clinic) visits per year was about 10 in FPWSCC and 7 in FPCC while other care (both home and clinic) visits were slightly less than 20 per year in FPWSCC and 40 per year in FPCC. These findings, and especially the total service contact figures, further document the different patterns of child care in the two experimental groups where FPCC received much more intensive child care inputs than FPWSCC. Because of the large variance in the number of contacts per family, the differences noted in relation to attitudes and beliefs are not statistically significant. However, the general patterns are very similar to comparisons involving use or non-use of services in any given year. For example, women uncertain about family planning used fewer services than approvers or disapprovers.

Table 3.7

ANALYSIS OF AB EFFECTS ON AVERAGE ANNUAL NUMBER OF VISITS
OR CONTACTS MADE BY ALL THE CHILDREN OF WOMEN WHO USED
CHILDREN'S SERVICES DURING 1969-71

Attitude	FPWSCC			FPCC		
	Illness Care (Clinic) Contacts	Other Care	Total	Illness Care (Clinic) Contacts	Other Care	Total
APPR						
Disapproves	11	20	31	8	46	54
Uncertain	9	17	26	6	30	36
Approves	10	18	28	6	38	44
DIE						
More	10	17	27	7	36	43
Uncertain/Same	10	19	29	6	41	47
Less	11	20	31	7	35	42

It appears that use of children's services has only a limited relationship to prior attitudes and beliefs, making these services more acceptable to most families in the community no matter what their initial attitudes or beliefs are. These services then may be a useful vehicle for health and family planning education.

Evidence for Changes in AB Being Induced by Use of Health Services

Analyses in subsequent chapters demonstrated the strong direct relationship between use of health services and family planning practice holding attitudes and beliefs constant. It is also important to identify whether some of the impact of health services was mediated by direct effects on attitudes and beliefs.

Women who were present in the study population and interviewed during both cross-sectional surveys (SUR_1 and SUR_2) were included in this analysis. Their attitudes towards family planning and beliefs about child death in the two surveys were compared and were classified as follows:

SUR_1	SUR_2
—	—

Positive change in attitude toward family planning = $\left\{ \begin{array}{l} \text{Disapprove} \longrightarrow \text{Uncertain} \\ \text{Disapprove} \longrightarrow \text{Approve} \\ \text{Uncertain} \longrightarrow \text{Approve} \end{array} \right.$

Negative change in attitude toward family planning = $\left\{ \begin{array}{l} \text{Approve} \longrightarrow \text{Uncertain} \\ \text{Approve} \longrightarrow \text{Disapprove} \\ \text{Uncertain} \longrightarrow \text{Disapprove} \end{array} \right.$

	<u>SUR₁</u>	<u>SUR₂</u>
Positive change in belief about child death =	$\left\{ \begin{array}{l} \text{More die} \longrightarrow \text{Uncertain/Same} \\ \text{More die} \longrightarrow \text{Fewer die} \\ \text{Uncertain/same} \longrightarrow \text{Fewer die} \end{array} \right.$	
Negative change in belief about child death =	$\left\{ \begin{array}{l} \text{Fewer die} \longrightarrow \text{Uncertain/same} \\ \text{Fewer die} \longrightarrow \text{More die} \\ \text{Uncertain/same} \longrightarrow \text{More die} \end{array} \right.$	

Earlier analysis had indicated that responses which were "uncertain" were a mixed category, often probably representing the most negative attitudes and beliefs. A second classification therefore involved only women who had clear-cut changes in attitude (e.g., disapprove → approve, approve → disapprove, more → fewer, fewer → more).

In addition to identifying changes in attitudes and beliefs, women or their children were grouped as having either used services in all three years (69-71) between the cross-sectional surveys, having used services in one or two of the years, or not having used services at all. For each of these three use categories the analysis compared the percentage of women who had a positive or negative change in attitudes out of all the women who potentially could change their attitudes in the specified direction. (For example, women already approving family planning could not appear in the denominator representing women with a potential for positive change.)

Both classifications produced very similar results out of which only a few were statistically significant. However, some of the results suggested

that services may be able to induce a change in attitudes and beliefs.

These results will be summarized below.

1. Changes in AB Related to Women's Services

Table 3.8 shows that users of illness care services for women had a greater positive change and less negative change in attitudes towards family planning than non-users. The effect on negative change comes the closest to being significant and both effects are strongest for women 35 and over. Women who did not use services but changed in a positive or negative direction in their attitudes were 60 and 28 percent respectively. Of those women who used services all three years similar percentages for positive change was 68 and for negative change was 23. Users of services during one or two years showed less favorable effect than those who used services for three years. In this analysis we combined two similar questions about women's beliefs related to death or survival of children. As can be seen in Table 3.8 there was no consistent pattern relating use of women's illness care services to changes in beliefs about child death.

Other care services for women did not consistently follow the pattern of illness care services in their impact on attitudes and beliefs. Significant service effects occurred only in the negative change direction of the APPROVE variable. Users of services for one or two years showed the least change (18 percent) and three year users about the same negative change as non-users. In this case users for three years may have included more older women.

Positive change in the CHILD DEATH variable was related to other care services in a manner very similar to illness care services. However, users

Table 3.8

Relationship Between Women's Services and Change in Attitudes and Beliefs

<u>Factor</u>		<u>Percentage of Women Changing Their Attitude or Belief by Amount of Illness Care Used</u>			<u>Significance</u>
		<u>No Use</u>	<u>One or Two Years</u>	<u>Three Years</u>	
APPR	(n)	92	216	200	$\chi^2_2 = 2.63$
Positive Change	(%)	59.8	61.6	68.0	
	(n)	104	321	290	$\chi^2_2 = 5.67$
Negative Change	(%)	27.9	24.9	22.8	($p \sim .05$)
DIE	(n)	39	118	112	$\chi^2_2 = 2.34$
Positive Change	(%)	38.5	41.5	33.9	
	(n)	55	144	146	$\chi^2_2 = 1.25$
Negative Change	(%)	16.4	23.6	21.2	
<u>Amount of Other Care Used</u>					
APPR	(n)	59	109	340	$\chi^2_2 = 0.51$
Positive Change	(%)	67.8	62.4	63.5	
	(n)	87	195	433	$\chi^2_2 = 6.33$
Negative Change	(%)	25.3	17.9	27.3	($p < .05$)
DIE	(n)	33	60	186	$\chi^2_2 = 1.16$
Postitive Change	(%)	39.4	41.7	34.4	
	(n)	41	84	220	$\chi^2_2 = 6.32$
Negative Change	(%)	22.0	31.0	17.7	($p < .05$)

Note: n = in this table signifies the number of women with a potential for change in any given cell. The percentage indicates the women who actually changes.

of other care services for one to two years showed almost twice the amount of negative change in beliefs about child death as users of these services for three years (31 and 18 percent respectively). Non-users had an intermediate amount of change. As in the above findings the main effect of services, when identified, seemed to be to prevent a negative movement in attitudes and beliefs.

2. Changes in AB Related to Children's Services

Table 3.9 summarizes the analysis of children's services and the APPR and DIE variables. Changes in approval of family planning were not significantly related to children's illness care (clinic) services, but changes in the positive direction followed a pattern consistent with a service effect similar to women's illness care. In this case 57 percent of non-users showed a positive change in contrast to 63 percent of three-year users. This pattern was found predominantly among families with all their children over 3 years of age. Three-year users of children's illness care (clinic) service had significantly less negative change in their beliefs about child deaths (15 percent) than non-users or users for only one to two years (27 and 28 percent).

The small number of non-users of children's other care services made testing for statistical significance not very meaningful. Basically, however, users of children's other care had less negative change in both the APPR and DIE variables, a finding which parallels the effect of women's services.

Finally, in Table 3.10 the number of contacts or visits made by users of children's services from 1969 through 1971 are compared with changes in approval of family planning and beliefs about child death. In this case only children

Table 3.9

RELATIONSHIP BETWEEN CHILDREN'S SERVICES AND CHANGE IN ATTITUDES AND BELIEFS

<u>Factor</u>		<u>Percentage of Women Changing Their Attitude or Belief by Amount of Illness Care Used</u>			<u>Significance</u>
		<u>No Use</u>	<u>One or Two Years</u>	<u>Three Years</u>	
APPR	(n)	58	140	216	$\chi^2_2 = 1.50$
Positive Change	(%)	56.9	57.9	63.4	
	(n)	113	236	326	$\chi^2_2 = 0.64$
Negative Change	(%)	23.9	20.3	22.4	
DIE	(n)	38	73	129	$\chi^2_2 = 1.65$
Positive Change	(%)	47.4	43.8	37.2	
	(n)	56	99	171	$\chi^2_2 = 8.53$
Negative Change	(%)	26.8	28.3	14.6	(p < .025)
<u>Amount of Other Care Used</u>					
APPR	(n)	9	63	193	--
Positive Change	(%)	77.8	73.0	64.8	
	(n)	22	90	288	$\chi^2_2 = 2.65$
Negative Change	(%)	36.4	20.0	23.3	
DIE	(n)	8	31	118	--
Positive Change	(%)	25.0	41.9	35.6	
	(n)	7	38	160	--
Negative Change	(%)	33.7	26.3	18.1	

Note: See Table 3.8

Table 3.10

RELATIONSHIP BETWEEN VOLUME OF CHILDREN'S SERVICES
AND CHANGE* IN ATTITUDES AND BELIEFS

Average Number of Services During 1969-1971 Per Family by
Experimental Group and Type of Service

<u>Factor</u>	<u>FPWSCC</u>		<u>FPCC</u>	
	Illness Care	Other Care	Illness Care	Other Care
APPR				
Positive Change	38.3	74.2	15.8	113.8
Negative Change	36.3	60.4	26.7	148.8
DIE				
Positive Change	50.0	68.8	17.8	83.3
Negative Change	27.1	39.1	16.2	77.1

*Definitive changes only, e.g. approve → disapprove or disapprove → approve; more → less or less → more.

of women with definitive changes (approve → disapprove, disapprove → approve; more → less, less → more) were included in the analysis. Although not statistically significant due to small numbers and a large variance the results tended to support the patterns of change established when comparing users with non-users and are therefore felt to have practical implications. In the FPWSCC experimental group positive change in both approval of family planning and beliefs about child death were related to higher average number of services received than were negative changes in these attitudes or beliefs. This was true of both illness care (clinic) and other care. In the FPCC experimental group the same pattern was shown for the DIE variable, but higher average use of services was found among those who had a negative change in attitude about family planning a finding which is not surprising since family planning education and services were not incorporated into the services of this group of villages until 1971.

In summary, there is evidence that provision of health services may have induced some small positive changes in attitudes or beliefs. However, the predominate detectable effect appears to be "preventive" in nature, supporting the continuation of positive attitudes and beliefs and limiting the extent of negative change. In the short period of the project, therefore, effects of services on family planning practice were most likely quite direct and only weakly mediated, if at all, by changes in attitudes and beliefs. The latter, however, may have become more important over a longer period if the project had continued.

Impact of Services on Health Indicators

Measurement of health benefits of the project services was important for two reasons: first, to test the specific impact of the various experimental inputs on health indices; second, experimental testing of the child survival hypothesis required a health care program that improved child health sufficiently so that benefits would be apparent to families and the village community. These results had to be achieved within the limitation that services must be replicable under the financial and manpower constraints prevailing in India and other less developed countries.

Data gathering on changes in health status was concentrated on children under three years of age. This reflects the emphasis placed on care of young children in FPCC villages which were also a part of the parallel nutrition project. Data were collected on all deaths through the special vital statistics surveys and registers in all study and control villages. Although data were available for all age groups, only in children under three were the numbers of deaths occurring in the study population large enough for useful analyses. An important measure of the effect of women's services would have been changes in maternal mortality rates, but this was not feasible because so few maternal deaths occurred in the study and control villages.

Special morbidity and anthropometric data were collected on all children under three in the nutrition project villages. These data were used in this section to demonstrate the impact of child health and nutrition services on measure other than mortality in FPCC villages.

Special studies were not carried out to measure changes in women's morbidity; however, perinatal mortality rates serve as a proxy for adequate antenatal care.

1. Mortality Effects

Mortality rates in the control villages of both the population and nutrition studies during the years 1970-73 served as the base against which the effects of services in the two child care experimental groups were compared. Table 3.11 presents the control rates as compared with those for FPWSCC and FPCC villages. The percentage differences in rates between the control and service villages are also shown. Mortality rates were calculated by caste group and age at death (fetal death, i.e., "stillbirths;" infant deaths under 1 month; infant deaths 1 month to 12 months; and child deaths 1 year to 3 years). Actually, only the two predominant castes (Jat-Sikhs and scheduled Sikhs representing "high" and "low" castes respectively) whose members make up about 75 to 85 percent of the total population are shown. Rates are also given in parentheses for the total population which includes all other castes - a mixture of high and low caste groups.

Table 3.11 includes figures from the Khanna Project which was conducted nearby in Ludhiana District ten years earlier. During the decade following the Khanna Project the Punjab experienced dramatic economic development as a result of the Green Revolution. Comparisons between Khanna mortality rates and our control village rates show an increase in stillbirth rates (possibly related to improved reporting), no decline in neonatal death rates, a decline of 39 percent in postneonatal rates and a 60 percent

Table 3.11

EFFECTS OF CHILDREN'S SERVICES ON MORTALITY RATES BY AGE,
CASTE AND EXPERIMENTAL GROUP (1970 - 1973)

Experimental Group	Caste	Stillbirths*		Infant Mortality **				Child (1-3) mortality***	
		High	Low	< 1 month		1-12 months		High	Low
a. Control Villages †		47 (57)	71 (57)	81 (78)	84 (78)	52 (51)	52 (51)	7 (19)	26 (19)
b. FPWSCC Villages		52 (44)	39 (44)	58 (64)	86 (64)	40 (54)	66 (54)	3 (7)	10 (7)
% Difference ††		+10.6 (-22.8)	-45.1 (-22.8)	-28.4 (-18.0)	+2.4 (-18.0)	-23.1 (+5.9)	+26.9 (+5.9)	-57.1 (-63.2)	-61.5 (-63.2)
c. FPCC Villages		27 (37)	37 (37)	67 (47)	48 (47)	28 (34)	33 (34)	12 (13)	18 (13)
% Difference ††		-63.8 (-35.1)	-47.9 (-35.1)	-17.3 (-39.7)	-42.9 (-39.7)	-46.2 (-33.3)	-36.5 (-33.3)	+71.4 (-31.6)	-30.8 (-31.6)
d. Khanna Study Villages †††		(36)	(36)	(74)	(74)	(83)	(83)	(48)	(48)

Note: "High" caste were the Jat Sikhs, the landowning farmers, and "Low" caste were the scheduled Sikhs, predominately landless laborers. These castes made up between 75-85 percent of the population. Total mortality rates including other castes are shown in parentheses.

* Rates are per thousand live and stillbirths combined.

** Rates are per thousand live births

*** Rates are per 1000 children 1-3 years of age.

†† $\frac{b(\text{or } c) - a}{a} \times 100 = \% \text{-Difference.}$

† Combined rates from the control villages of the Population and Nutrition Studies.

††† Wyon and Gordon. The Khanna Study

decline in 103 year child mortality. The decline in the latter two rates was presumably attributable primarily to socioeconomic changes that had occurred during the intervening decade.

Overall, the stillbirth rate was 57 per 1000 live and stillbirths in the control villages and was 23 to 35 percent lower in the services villages. We presume that this measures the probable effect on the fetus of prenatal care for the mother, especially the provision of iron and folic acid (for anemia) to all mothers and nutritional supplementation to poorly nourished mothers as judged necessary by the family health worker. Comparable effects were produced in both FPWSCC and FPCC in the low caste group, but only in FPCC was there any effect measured among the high caste families. The more intensive services of FPCC appear to have been able to encompass all caste groups, while FPWSCC workers, because of less available time, may have concentrated their prenatal care, especially supplementation, on low caste mothers.

Infant mortality rates were split into neonatal death rates (first month of life) and post-neonatal death rates (1 to 12 months). Control villages had 78 neonatal deaths per 1000 live births, and the rates were reduced to 64 in FPWSCC and 47 in FPCC, differences of 18 and 40 percent respectively. Unlike the results for stillbirths, the high caste children in FPWSCC benefitted from the services, but not the low caste. This was in contrast to FPCC where the low caste groups appeared to receive the maximum benefit, a reduction of 43 percent. Apparently, in villages where services were less intensive in their outreach (FPWSCC), high caste families actively sought care from the project or other sources and achieved moderate reductions in neonatal mortality. However, low

caste children benefitted only in those villages (FPCC) where outreach into homes was much more intensive (weekly home visits in FPCC compared to monthly visits in FPWSCC after the immediate postpartum period). Basically the same pattern held for children in the post-neonatal period with high caste children in FPWSCC and all children in FPCC receiving significant benefits from the child care services. The obvious program implications from these findings are that not only is frequent surveillance of infants important in order to reduce mortality, but such care must be focussed in special outreach programs on the lower socioeconomic groups to compensate for their greater needs and the constraints affecting their use of services.

Although deaths among 1-3 year olds were fewer in number, the impact of services on such deaths was just as great as the impact on deaths at an earlier age. The 1-3 year mortality rates in FPWSCC and FPCC were 7 and 13 per 1000 children as compared to 19 in control villages. In this case the impact was greatest in FPWSCC villages (63 percent lower than controls) and services had equal impact among all castes. Interestingly, unlike services for children under 1 year of age, services for older children in FPCC had no effect on high caste children. This is difficult to explain but it is possible that high caste children in these villages may not have utilized nutrition supplementation. Results from the nutrition project showed that health care had a major impact both under 1 year and from 1-3 years of age while nutrition care was most effective from 1-3 years of age.

In general, the difference in the number of deaths reach statistical significance only when castes are combined, but the caste differences are important indications of the relative impact of child health services on subgroups of the population. On the whole, the combined services in

FPWSCC villages had a moderate and caste selective impact on infant mortality rates and a much more effective impact on child death rates of all caste groups. More intensive child care services (FPCC) had a much more consistent impact on all age specific mortality rates, with caste differences showing up only after 1 year of age.

In depth interviews of mothers of children who died ("verbal autopsies") provided additional insights that possibly explain some of the differences noted in death rates among castes. Few children of either high or low castes did not receive treatment for illnesses that lead to death. However, high caste families tended to seek care earlier than low caste families, with 68 percent of high caste children who died receiving care in the first 24 hours of their terminal illness compared with 49 percent of low caste children. This may help explain the improvement in infant mortality among high caste children but the absence of a drop in death rate in low caste infants when services were only accessible (FPWSCC), but not delivered in the homes intensively as in FPCC villages.

Finally, to contribute to information on the influence of child deaths in motivation for family planning, parents of children who died were asked in the course of the in-depth "verbal autopsy" interviews whether they intended to have another child. No association was found between positive responses and the sex, age, nutritional status or caste of the deceased child. The stated intent to have another child was strongly associated, however, with the total number of living siblings. Ninety-five percent of mothers who had no or only one living child said they intended to have more children compared to 54 percent of those who had two to three living children, and 11 percent who had four or more living children.

2. Morbidity Effects

Weekly morbidity surveillance was carried out as part of the parallel nutrition study. Data therefore are available which measured the effect of child care services on the illness load of children in the FPCC experimental group in comparison to children in the nutrition project control group of villages. Table 3.12 summarizes the findings for these two sets of villages. The upper section of the table shows the average duration of episodes of seven specific illness symptoms in control and FPCC villages. These conditions were selected for their frequency and/or importance in the 0-3 year age group. For each condition the average duration was less in FPCC villages, with differences ranging from 14 to 33 percent less than in the controls. Using the above average durations and an average incidence rate* for each condition, the total annual days of illness due to these conditions per child could be calculated for infants under one year of age and for children 1-3 years of age. Services in FPCC effectively reduced the amount of illness by 22 days per year in each age group, a reduction of 16 percent under one year of age and 21 percent from 1-3 years of age. This reduction of illness reflects the changes already demonstrated in mortality. In addition, reducing the number of days of illness by over 3 weeks per year certainly reduced the metabolic drain on nutrients in children, and presumably contributed to improved nutritional status.

3. Growth

Analysis of the effect of services on the growth of children is available only in the FPCC group of villages. As in the morbidity

* Because the incidence of disease was underreported in the control villages, the average incidence across all villages was used. Since within group analyses showed actual reduction of incidence in some conditions in children with better nutritional status, the above results probably understate the total impact of children's services on morbidity.

Table 3.12

EFFECTS OF CHILDREN'S SERVICES ON MORBIDITY LEVELS

(1970 - 1973)

			Control Villages (days)	FPCC Villages (days)	Percent Differences
Average Duration of Specific Conditions in Days per Episode	Fever		3.9	2.9	- 25.6
	Cough		11.4	8.5	- 25.4
	Pneumonia		3.6	3.1	- 13.9
	Diarrhea		6.3	5.1	- 19.1
	Vomiting		5.2	3.5	- 32.7
	Eye Infection		8.3	6.3	- 24.1
	Skin Infection		8.7	7.2	- 17.2
Annual Average days of Illness per Child	For All	< 1 year	135	113	- 16.3
	Above Conditions	1-3 years	105	83	- 21.0

analysis these data come from the nutrition project and can be compared with the nutrition control data.

Significant differences were found between FPCC villages and the controls in average weights and heights at ages 17 months through 36 months. Children in FPCC villages exhibited significantly higher ($p < .05$) average weights and heights. This pattern was consistent for both males and females and for high and low castes. Average weight, adjusted for unequal sex-caste composition in the groups and expressed as a percentage of the Harvard standard weight is illustrated in Figure 3.3 for ages above one year. Differences between the service and control villages were on the order of 3-4 percentage points, corresponding to 0.4 and 0.6 kg beyond two years of age. Differences in average weight at ages below 13 months were not statistically significant ($p < .10$) except at birth, at which time the control averages were actually higher (probably due to under-reporting of birth weights of low birth weight babies).

At ages 21 months and above, average height was significantly greater ($p < .01$) in the service villages than in control villages (Figure 3.4). Differences between heights in the FPCC and control groups averaged about 1.5 - 2.5 percentage points or 1 to 2 cm, starting a little before the second year of life.

Sex and caste showed a highly significant ($p < .001$) effect upon weight at every age. Males averaged from 0.6 kg to 1 kg higher than females with the largest differences occurring in the fifth through the 17 months. Beyond the age of one year, high caste (Jat-Sikhs) average weights were approximately 0.75 kg higher than low caste (scheduled Sikhs) averages.

Sex and caste also had a strong influence ($p < .001$) upon heights.

Figure 3.3

EFFECT OF CHILDREN'S SERVICES ON AVERAGE WEIGHT, ADJUSTED FOR SEX AND CASTE,
EXPRESSED AS A PERCENTAGE OF THE HARVARD MEDIAN WEIGHT
STANDARD (1970-1973)

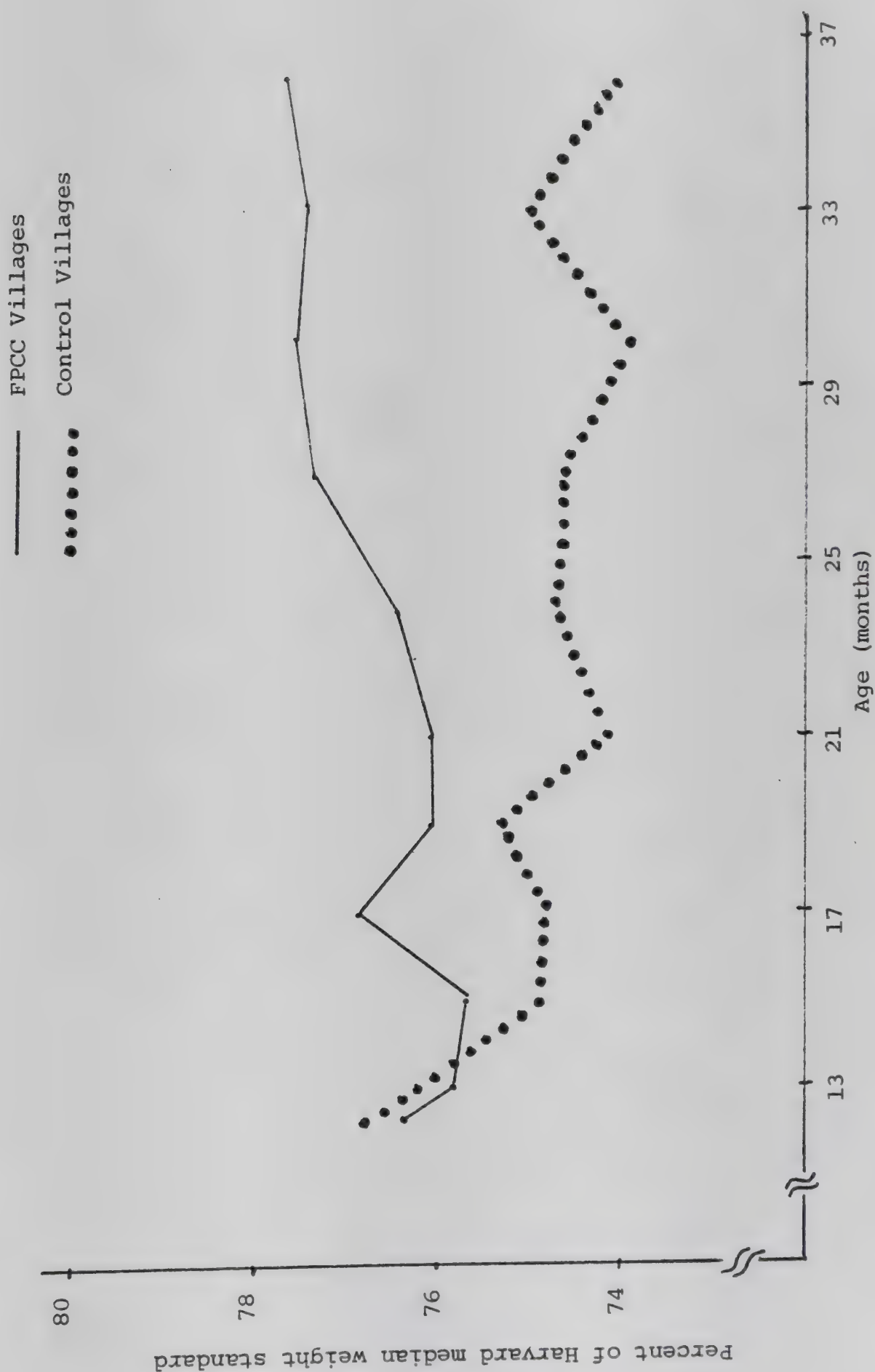
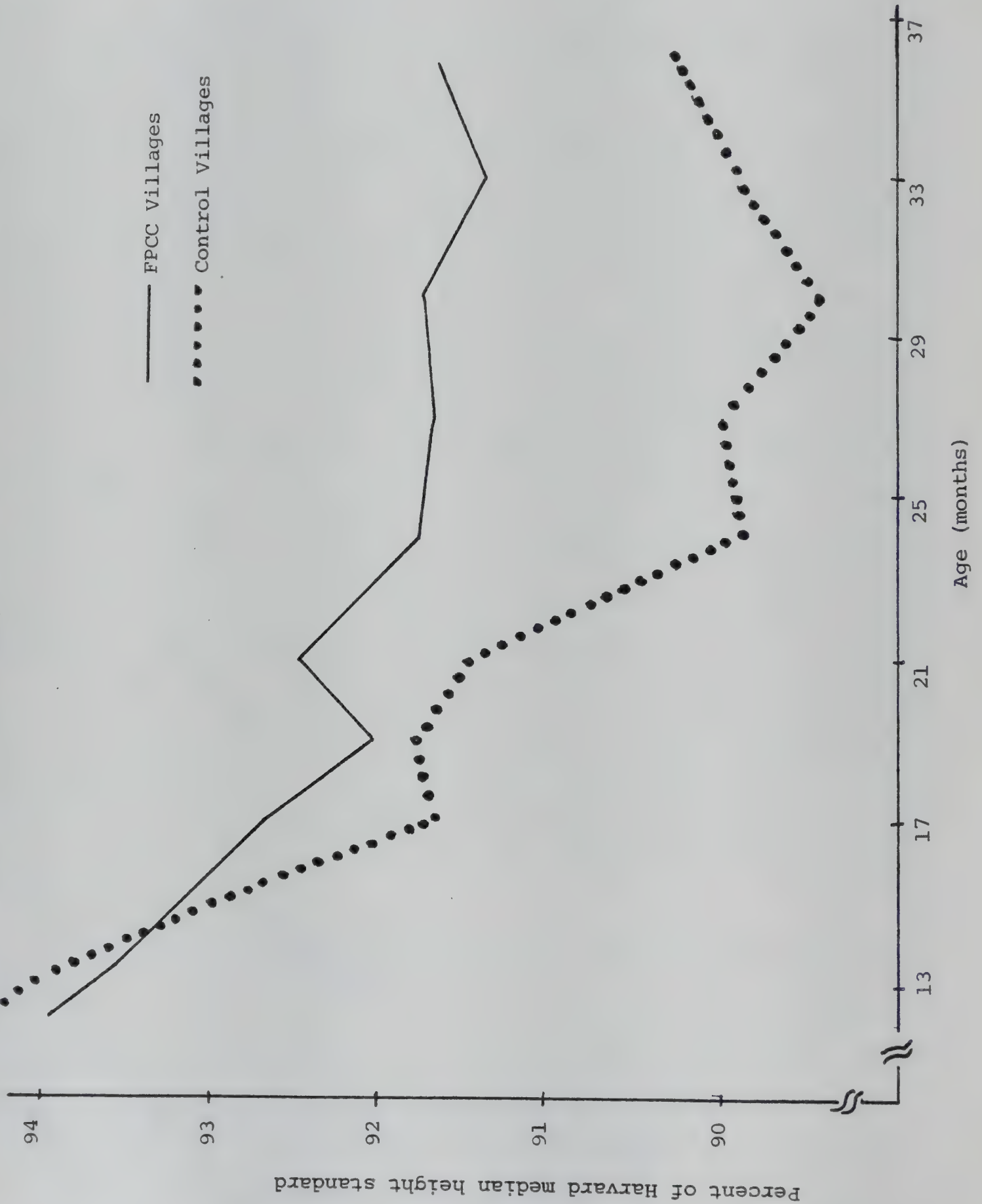


Figure 3.4

EFFECT OF CHILDREN'S SERVICES ON AVERAGE HEIGHT, ADJUSTED FOR SEX AND CASTE,
EXPRESSED AS A PERCENTAGE OF THE HARVARD MEDIAN HEIGHT STANDARD
(1970-1973)



Male averages were approximately 2.7 cm higher than female averages in the age range 9-17 months, with differences then decreasing to slightly less than 2 cm at ages 27 months and above. Differences in average height between high and low castes increased from 1.4 cm at age 9 months to approximately 2.5 cm after two years of age.

In summary, these relationships between services, sex and caste were additive so that a high caste male in a service village and an average weight and height 2 kg and 6 cm more than a low caste female in a control village.

The number of siblings alive at the time of the child's birth had a significant ($p < .05$) influence upon mean weight and height. Children with two or more male siblings had the lowest average weights and heights regardless of the number of female siblings. Those with two female siblings in addition to two or more male siblings were particularly low in weight and height, or approximately 0.4 mg and 1.3 cm less than those with only one or no living brothers. This finding demonstrates the potential effect that family planning might have in improving the nutritional status of children and justifies its inclusion in health and nutrition programs.

POP MONOGRAPH

CHAPTER 4

RELATIONSHIP BETWEEN SPECIFIC
HEALTH SERVICES AND FAMILY PLANNING USE

William A. Reinke and Robert L. Parker

The major hypothesis underlying the present study was that utilization of health services contributes directly to family planning practice and ultimately to fertility reduction. This direct impact was felt to be mediated through improved rapport between health and family planning workers and the community and also through the use of spontaneous or predetermined "entry points" in the health services when family planning education could be appropriately introduced or motivation to use contraception reinforced. For example, arguments for longer spacing between children could readily be provided when the worker was caring for and showing concern for the health of a mother or child.

In addition to the direct effect of providing services it was postulated that improving the general health status of children or reducing infant and child mortality could indirectly influence couples to change beliefs or behavior associated with the expectation that it was desirable to have many children in order to assure that some would survive. It was hoped that the latent period that was assumed to be necessary for this indirect effect to become evident would be shortened by educational efforts pointing out to parents the improved health of the children. The program incorporated in a systematic educational effort

the use of motivational entry points to create awareness of child survival. Indeed, a clear relationship between health services and family planning use did emerge and is documented in the following pages.

Granted verification of the association, a number of corollary policy-relevant questions arise. Which service components are most significant in the relationship? Are services to women more important than child care, or the other way around? Are provider-initiated outreach services necessary, or is convenient access to clinic-based services sufficient to attract clients into the broader health care-family planning system? What is the sequential pattern of services utilization? Is there a substantial lag time between receipt of health services and family planning acceptance? Is continuing, intensive provision of health services necessary to sustain contraceptive use? Do users of health services tend to be prior users of family planning with the result that health care produces a substitution effect on family planning acceptance rather than a more effective recruitment effect? Is the health services effect merely a proxy for intervening attitudinal effects which could lead to practice of family planning regardless of the availability of program health services? These questions are addressed in order in the present chapter and elaborated further in the next one.

Variables used in the analyses include the following:

1. Program Family Planning Practice (PGM-FP) - For this variable women (or their husbands) were classified as having used contraceptives or sterilization at any time during the specified year or years of the program.

2. Prior Family Planning Practice (PRIOR) - Use of family planning methods before the start of the project were categorized as no use, use of traditional methods only, or use of modern methods.

3. Women's Illness Care (WILL)

4. Women's Other Care (WOTH)

5. Children's Illness Care (CILL)

6. Children's Other Care (COTH)

Visits or service contacts under the above program variable headings were measured by: (a) presence or absence of one or more visits or contacts during a specified time period; or (b) the average number of visits or contacts per individual who received any services during a specified time period. Where appropriate, the years in which services were provided were analyzed separately.

Women included in the analysis of health service effects were from three experimental groups of villages which varied in availability of services as follows: (a) FPWSCC (family planning plus women's services plus children's services); (b) FPWS (family planning plus women's services); and (c) FPCC (family planning plus children's services). Other villages which did not receive women's or children's services were excluded (i.e., the control and FPEd villages since the analysis was focussed on the relationship of health services to family planning use.

Program Health Services and Family Planning Use by Experimental Group

Comparison of the relationship between receipt of health services and program practice of family planning was first undertaken broadly

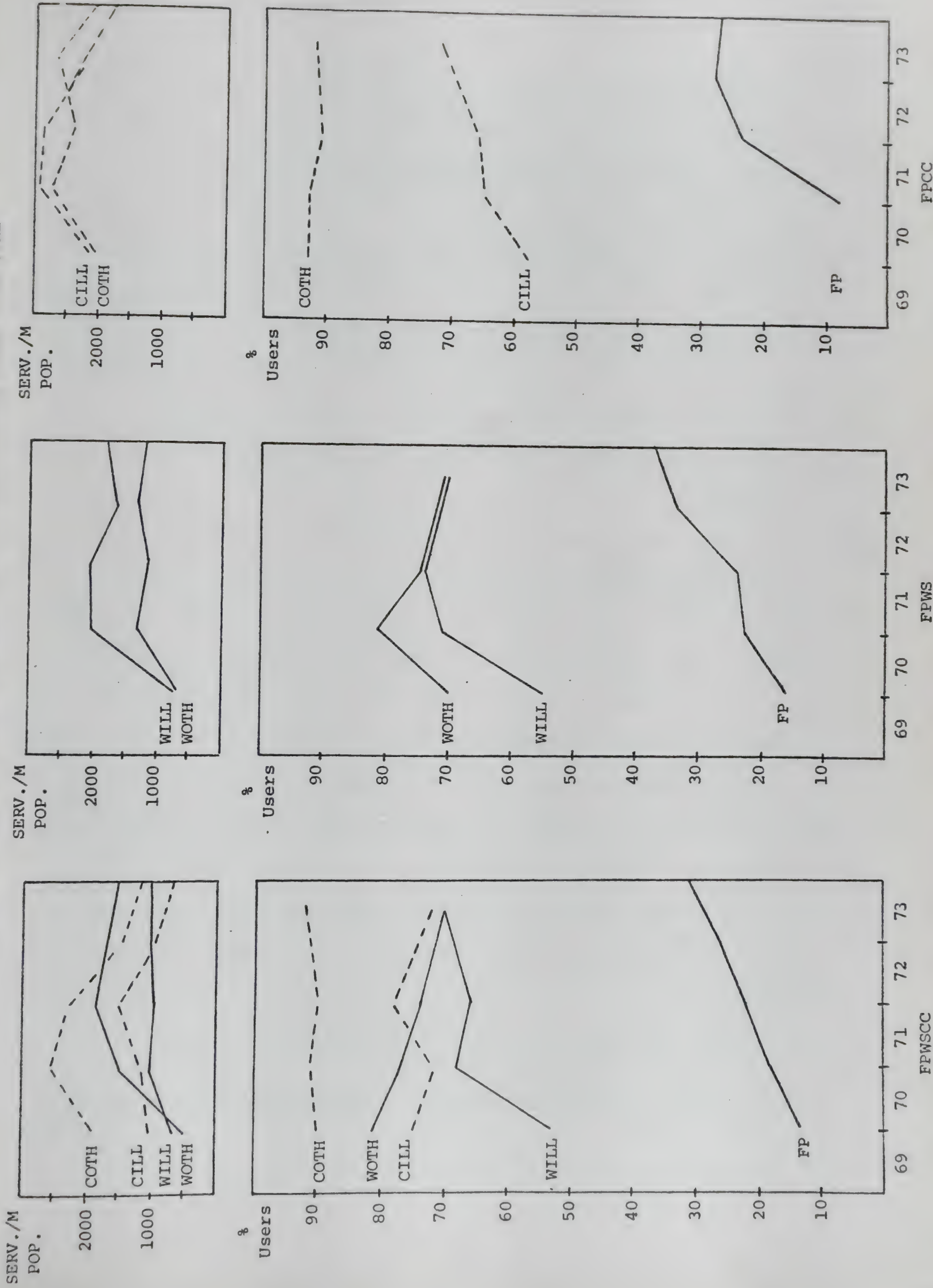
between experimental groups over time, as shown in Figure 4.1. Family planning practice, as measured by percentage of current users tended to increase throughout the project period, as indicated by the lower lines of the figure. In contrast, as shown in the upper set of curves in Figure 4.1, the project succeeded early in the program in reaching a majority of the target population with all types of health services, and this high level of coverage was sustained thereafter. As described in Chapter 3, the number of contacts per 1000 population peaked near the middle of the project and tended to decline thereafter, only slightly for women's services but more markedly for children's services.

Overall, there is no clearly discernible time-phased association between use of health services and family planning when relationships are viewed at the aggregate experimental group level. Subsequent analyses are based, therefore, upon the sequence and continuity of use of specific types of services by individual women and children.

Program Health Services and Family Planning Use by Individual Families

Community-level analysis based upon differential availability of health service components provided at best a crude first approximation of the relationship between use of health services and family planning. The relationship depends more directly upon actual utilization within the community of whatever program services are made available. Henceforth the unit of analysis, therefore, will be the individual family and its members, regardless of experimental group affiliation. In other words, we shall distinguish between use and non-use of individual services, regardless of whether non-use

HEALTH SERVICES AND FAMILY PLANNING USE BY EXPERIMENTAL GROUP OVER TIME



was due to non-availability or lack of exposure to available services. Disregard for services availability undoubtedly dilutes the utilization effects derived in subsequent analyses but has been a practical necessity in providing enough observations for meaningful analysis.

The first-cut appraisal at this level of analysis is summarized in Table 4.1. Within each of four categories of health services (WILL, WOTH, CILL, COTH), eligible women are distinguished according to whether or not they utilized a specified service for themselves or their children at any time during the program period. The table shows the percentage within each use and non-use category who became program acceptors of family planning.

The results reveal consistently higher family planning practice rates among users of health services than among non-users. With the exception of the women's illness category (WILL), acceptance rates among service users were approximately three times the rates among non-users. Specifically, more than half of the service users became family planning acceptors, whereas less than one-fifth of the non-users of health services accepted family planning. Although somewhat less striking, the difference in acceptance rates between users and non-users of WILL services was statistically significant. The main feature of this service category was the somewhat higher acceptance rate among non-users of services, suggesting that many of these women were reached through other service channels.

Continuity of Health Service Users and Family Planning Use

Evidence of a strong association between health services use and

Table 4.1

RELATIONSHIP BETWEEN PROGRAM USE OF HEALTH SERVICES
AND ACCEPTANCE OF FAMILY PLANNING

Health Service Type	n	Percent Family Planning Acceptors	χ^2	Sig. Level
Women's Illness (WILL)				
Use	1,063	51.7	28.60	p < .001
Non-Use	178	29.8		
Women's Other (WOTH)				
Use	1,101	52.5	59.56	p < .001
Non-Use	140	17.9		
Children's Illness (CILL)				
Use	929	51.3	56.33	p < .001
Non-Use	130	16.2		
Children's Other (COTH)				
Use	828	55.0	96.79	p < .001
Non-Use	231	18.6		

contraception leads to further investigation of the mechanism of this association. In particular, what is the importance of the timing and continuity of health services provision?

For purposes of exploring the continuity question, the program was divided into two time segments covering the period 1969-71 and 1972-73 respectively. Health service users who became family planning acceptors were distinguished according to whether they received services in one or both of the time segments. Within each service sub-group, the percentage of acceptors who practiced family planning in both time segments was calculated to compare with those whose practice was limited only to the earlier or later period. The results are shown in Table 4.2

With the exception of the women's other (WOTH) service category, no significant differences in family planning practice are noted between part-time and continuing users of health services. The results suggest that while some use of health services is closely associated with acceptance of family planning, continued contraceptive practice is more sensitive to factors other than repeated exposure to health services.

The one exception to the above finding is noteworthy inasmuch as it suggests, perhaps surprisingly, that part-time recipients of WOTH services were more likely to be continuing users of family planning than full-time WOTH recipients. In particular, 86 percent of the 102 part-time service users were continuing users of family planning. In fact, the exceptional finding is not as surprising as it may at first appear, since those who underwent sterilization necessarily became full-time users of family planning and at the same time the continuing need for WOTH services was diminished.

Table 4.2

RELATIONSHIP BETWEEN CONTINUITY OF HEALTH SERVICES
AND FAMILY PLANNING USE

Health Service Type	n	Percent Family Planning Users: 69-71 and 72-73	χ^2	Sig. Level
Women's Illness (WILL)				
Used 69-71 or 72-73	76	67.1	0	n.s.
Used 69-71 and 72-73	474	67.1		
Women's Other (WOTH)				
Used 69-71 or 72-73	102	86.3	23.30	p < .001
Used 69-71 and 72-73	476	61.3		
Children's Illness (CILL)				
Used 69-71 or 72-73	71	53.5	2.53	n.s.
Used 69-71 and 72-73	406	63.1		
Children's Other (COTH)				
Used 69-71 or 72-73	131	67.9	2.90	n.s.
Used 69-71 and 72-73	324	59.0		

Sequence of Health Service Use and Family Planning Use

If the fact of health services use, rather than the continuity of use, is the more critical factor associated with acceptance of family planning, the timing issue becomes a special concern. Is receipt of health services associated with nearly concurrent acceptance of family planning, or is a considerable lag time involved? Or did family planning acceptance tend to precede the use of health services or vice versa? These questions have been analyzed in two ways.

First, in Table 4.3 we examine the relationship between volume and timing of health services received by a woman or her children and her practice of family planning. The investigation excludes individuals who received no health services during the project. Average numbers of health service contacts received in either 1969-71 or 1972-73 are related in columns (1)-(4) of the table to four mutually exclusive categories of family planning practice: none at all; practice only in 1969-71; practice only in 1972-73; or practice in both 1969-71 and 1972-73. Columns (5)-(7) selectively aggregate the data in ways which permit the comparative analyses summarized in columns (8)-(13).

The average number of illness care visits made by women (WILL) in 1969-71 was largest (24) for those who practiced family planning in those years only, reached 21 for those who practiced family planning in both time periods, was 18 for 1972-73 practitioners, and was only 16 for non-practitioners. In contrast, more visits for women's illness care in 1972-73 were made by those who were practicing family planning at that later time, especially if they were earlier users as well. A more uniform pattern of other care services (WOTH) was exhibited among women under 35.

RELATIONSHIP BETWEEN FAMILY PLANNING PRACTICE AND AVERAGE NUMBER OF HEALTH SERVICE CONTACTS DURING EARLIER AND LATER PORTIONS OF THE PROJECT

Chapter 4/11

Children's services for illness (CILL) was more variable and showed patterns roughly similar to those for women's illness care. The average number of child visits during 1969-71 ranged from 18 in the case of non-acceptance of family planning to 39 in the case of family planning practice during the 1969-71 period. It should be recalled that the corresponding services range of women's services (WILL) was 16-24.

The analysis of children's other services (COTH) was limited to children under three and was split between the two experimental groups with child care since the volume of scheduled home visits differed substantially between them (monthly surveillance visits in FPWSCC and weekly visits in FPCC). In both experimental groups the volume of COTH services was higher than that for other types of services. For example, children of non-acceptors of family planning in the FPWSCC group of villages received, on average, 60 COTH visits in 1969-71, whereas the number of WOTH visits averaged 13. In spite of higher average service levels the receipt of COTH services was relatively uniform among family planning groups, as was found in the case of WOTH services. In general, then, variations in illness care were found to be more closely associated with family planning use than was receipt of other services. Presumably, this is because illness care was patient initiated and reflected the natural predilections of families.

Many of the above findings, although quite striking, just bordered on statistical significance because of large variances and the relatively small numbers involved in each category. Further appraisal, summarized in columns (8) - (13), produced a number of clearly consistent patterns that are noteworthy.

1. Column 8 compares non-users of family planning with those who became acceptors at anytime during the program. For example, the latter group averaged 20.5 WILL services during 1969-71, whereas non-acceptors of family planning averaged 16.1 WILL services. The difference, 4.4 is recorded in Column 8. Overall we find that women who never practiced family planning invariably received fewer services than other women and had children who likewise received fewer services.

2. Column 9 relates only to 1969-71 services and compares those who practiced family planning concurrently with those who accepted later. The results show that family planning users concurrently received more health services of all types than women whose practice of family planning began later.

3. Column 10 presents analagous findings for the 1972-73 period. Women who practiced family planning at that time tended to be greater concurrent users of health services than earlier family planning users who had discontinued by 1972-73.

These three findings support the conclusion that use of program family planning is positively associated with the volume of health services.

4. Admitting that use of health services in 1969-71 improved the chances for family planning acceptance at that time, did heavy early use of health services help to sustain family planning practice into the 1972-73 period? The results of Column 11 suggest the answer to this question. Here we distinguish between 1969-71 acceptors who also practiced family planning in 1973-73 and those who did not. For reasons that are unclear,

it appears that, if anything, the continuing users had received fewer health services early in the program than those who discontinued family planning practice.

5. Column 12 provides a complementary analysis of 1972-73 health services use among 1972-73 users of family planning. The question here is whether new recruits to family planning exhibited a different pattern from previous users. The results are inconclusive except to suggest that perhaps the new recruits received more children's other services during the period of successful recruitment to family planning. While not significant in themselves, the results of Columns 11 and 12 tend to reinforce the importance of concurrence between receipt of health services and practice of family planning.

6. The issue thus far has been: How does use of health services lead to family planning practice? We next ask the reciprocal question as to whether early contact with the system through family planning acceptance might lead to increased subsequent use of health services. In other words, was 1972-73 use of health services greater among earlier acceptors of family planning than among those who first accepted in 1972-73? Column 13 provides little evidence to support this conclusion. The analysis is confounded, however, by the concurrent association between health services and family planning use in 1972-73. Column 12 findings effectively removed this factor since they were limited to 1972-73 users of both health and family planning services. Nevertheless, considering columns (12) and (13) together, we see no suggestion of a FP → Health Services association.

Family Planning Use Relative to Fixed Period of Health Service Use

An additional approach to analysis of the direction of association between health services and family planning use is presented in Table 4.4. Here the use of health services at a project midpoint (1971) is compared with earlier (1969-71) use and later (1972-73) use of family planning, as well as with non-use of family planning. As in earlier analyses, non-acceptors are clearly different from acceptors in their use of health services. In no case, however, are prior and subsequent users of family planning statistically different in their receipt of health services in 1971.

As an example, only 59 percent of women who never practiced contraception during the project used illness care services in comparison to 76 and 78 percent of those women who practiced family planning either early or late in the project. The difference between 76 and 78 percent is not statistically significant.

Because sterilized women (or women whose husbands were sterilized) received other care services at a much reduced rate after 1970, they were excluded from the analysis of other care. The remaining family planning users were almost totally covered by these other health services (91-93 percent) in contrast to non-users of family planning (62 percent coverage).

Use of children's services followed similar patterns in that family planning acceptors received higher rates of service coverage in 1971, especially for other services, than non-acceptors. Coverage levels were not, however, distinguishable by time of practice of family planning.

As a result of these varied analyses, the most striking finding continues to be the importance of concurrent use of health and family planning services. The implications of this finding for program management

Table 4.4

RELATIONSHIP OF FAMILY PLANNING PRACTICE DURING
THE PROJECT TO USE OF HEALTH SERVICES IN 1971

Health Serv. Type	Year of FP Use	n	Hlth. Serv. Users (%)	χ^2 (69-71 vs. 72-73)	Sig. Level
WILL	Non-Use	644	58.9	0.22	n.s.
	69-71	474	76.2		
	72-73	128	78.1		
WOTH*	Non-Use	632	61.7	0.53	n.s.
	69-71	388	91.0		
	72-73	127	92.9		
CILL (<3)	Non-Use	175	78.9	2.64	n.s.
	69-71	200	91.5		
	72-73	97	85.6		
CILL (≥ 3)	Non-Use	336	54.5	0.75	n.s.
	69-71	156	75.6		
	72-73	33	66.7		
COTH (<3)	Non-Use	175	80.6	0	n.s.
	69-71	200	96.5		
	72-73	97	95.9		

*Women who had been sterilized were excluded from the analysis of Women's Other Care Services.

are clear. For health services to produce a sustained effect on family planning practice, services must be well coordinated and closely combined with the provision of contraceptive services. The finding gives credence to the postulated importance of the direct linking of integrated health and family planning services through surveillance and the use of concurrent service "entry points."

Health Service Use Controlling for Prior Family Planning Use

We have already established that prior users of family planning are more likely to become program users. It is conceivable that these prior users might have been generally inclined to respond to a variety of modern services, including health care, when it was made conveniently available. If such were the case, program acceptance of family planning might have been merely in response to a prior felt need for family planning, and the causal role of health services utilization would have been accordingly spurious. In the present section, therefore, we investigate the three-way relationship between prior use of family planning and program use of health services and family planning.

Table 4.5 reveals that a prior history of family planning practice was indeed associated with greater utilization of project health services for women, though not with children's services. Women who had not used family planning any time before the project had a utilization rate of illness care (clinic) services of about 63 percent in both 1970 and 1971. The rates for users of traditional family planning methods were 74 and 70 percent, and for prior users of modern contraceptives they were 75 and 76

Table 4.5

RELATIONSHIP OF FAMILY PLANNING PRACTICE PRIOR TO THE PROJECT
TO USE OF HEALTH SERVICES DURING THE PROJECT

Year and Recipient	Prior FP Use	n	Type of Health Service			
			ILLNESS CARE (CLINIC)		OTHER CARE	
			% Using	χ^2	% Using	χ^2
1970 WOMEN	NO USE	649	63.6	16.17	73.8	20.02
	TRAD	412	74.0	(p < .001)	83.5	(p < .001)
	MOD	185	74.6		85.1	
1971 WOMEN	NO USE	649	63.0	13.89	68.5	10.03
	TRAD	412	70.4	(p < .001)	75.5	(p < .01)
	MOD	185	76.2		63.8	
1971 CHILDREN <3	NO USE	254	84.6	0.52	88.2	1.50
	TRAD	183	86.3	(n.s.)	91.8	(n.s.)
	MOD	35	88.6		100.0	
1971 CHILDREN ≥3	NO USE	246	57.3	3.57		
	TRAD	192	64.6	(n.s.)		
	MOD	87	66.7			

percent. Although a greater percentage of women received other care services than illness care a similar pattern was noted between prior users and non-users of family planning except for prior users of modern methods in 1971. Only 64 percent of the latter women used other care services, compared with 76 percent of prior users of traditional methods. Since this was not seen in 1970, it most likely represents a decrease in coverage related to changes in service guidelines of the project. Most of the prior users of modern methods had been sterilized and therefore did not require visits to assess their fertility status. Although women of different ages used health services at different rates, their use of family planning produced such similar effects on use of health services that all ages were combined in Table 4.5 and subsequent tables unless specified otherwise.

In the children's service analysis, women with children under 3 were analyzed separately since other care was exclusively targeted to this group of children. Because little difference was noted in use of children's services between 1970 and 1971, only services in the latter year are shown in the table. Although the children under 3 of women who never had practiced family planning used children's services slightly less than the children of prior family planning users (whether users of traditional or modern methods) the differences were not significant. The use rates for illness care (clinic) services and other care were almost identical. Similar findings were noted for women with children over 3 but the total use rates for these services were lower.

In summary, the main differences in use of health services were between non-users and prior users of family planning. Differences

between prior users of traditional and modern methods were non-significant in all but one case (women's other care in 1971). It would appear that women who used family planning prior to the project were more open to using health services as well as program family planning as seen in Chapter 2. The non-users of family planning prior to the project may represent a more resistant population that would require special efforts in order to ensure adequate coverage, at least in terms of women's services.

Health Service Use Controlling for Prior and Program Family Planning Use

The combined relationship between prior and program family planning use and use of health services is shown in Table 4.6. In this analysis use of family planning at any time during the project was considered program use (PGM-FP).

The largest and most significant variations in health services utilization occurred with respect to women's services. For illness care, for example, the use level in 1971 ranged from 55 percent for women who were neither prior nor program acceptors of family planning to 82 percent for women who used modern methods in both periods. Among women whose practice of family planning was confined to one of the two periods, program users had a somewhat higher rate of health services use (75 percent) than prior users (64 percent). Prior users of traditional methods were combined with prior non-users in this analysis since they were comparable in their proportionate use of health services. Age had no effect on any of the above noted differences.

Women categorized by their family planning experience used other care services much as they used illness care. Program family planning

users who had used modern methods prior to the project were found to use other care services at a rate of 63 percent, which became over 90 percent when women who had used a permanent method (tubectomy or vasectomy) were excluded from the analysis. Women 35 years and older used other care services less than younger women but the trend was in the same direction.

The children under 3 years of age of women who never used family planning made use of either illness care in the clinic or other care services in more than 76 percent of the cases. Use of these services increased to 83 and 87 percent of children whose mothers were prior-FP users but non-program-FP users, and to between 90 and 100 percent if their mothers were program-FP users. Older children's use of illness care varied in much the same way from 50 percent use by those whose mothers did not use family planning to a high of 75 percent among those whose mothers were PGM-FP users.

Limiting attention to program non-users of family planning, there was a significant difference in use of women's health services by prior users, as compared with non-users. Thus, for example, the 64 percent level of illness services among prior acceptors is significantly greater than the 55 percent figure for non-users. Corresponding differences with respect to child care are not statistically significant, however.

Limiting attention to program users of family planning, no significant differences were found in utilization of any category of health services according to prior status of family planning use.

To summarize the findings from Table 4.6, prior use of family planning did contribute to program use of health services, especially those for women. Even more pronounced, however, was the association

Table 4.6

COMBINED EFFECT OF PRIOR AND PROGRAM FAMILY PLANNING PRACTICE
ON USE OF HEALTH SERVICES IN 1971

Recipient of Service and Type of FP Use	n	Type of Health Service			
		Illness Care (Clinic)		Other Care	
		% Using	χ^2	% Using	χ^2
WOMEN					
None	387	55.3	52.42 (p < .001)	56.6	82.71 (p < .001)
Prior, No Pgm	256	64.1		67.6	
No Prior, Pgm	467	75.2		84.4	
Trad Prior, Pgm					
Mod Prior, Pgm	136	81.6		63.2 (90)*	
CHILDREN <3					
None	106	76.4	11.06 (p < .005)	76.4	32.49 (p < .001)
Prior, No Pgm	69	82.6		87.0	
No Prior, Pgm	269	89.6		95.9	
Trad Prior, Pgm					
Mod Prior, Pgm	28	89.3		100.0	
CHILDREN ≥3					
None	178	50.0	22.84 (p < .001)		
Prior, No Pgm	158	59.5			
No Prior, Pgm	134	73.9			
Trad Prior, Pgm					
Mod Prior, Pgm	55	74.5			

*Number in parenthesis indicates percent using services when sterilized women are excluded from the analysis.

between program use of family planning and health services. In fact, program family planning use essentially obscured the effect that prior family planning use had on utilization of health services.

Program Family Planning Use Controlling for Prior Practice and Health Services Use

The much more important intervention question dealing with the possible influence of health services utilization on program family planning, controlling for prior family planning use, was examined next using the percent of women practicing contraception as the dependent variable (Table 4.7).

A strong association between services and program family planning was again shown, but this time the relative impact of prior family planning use was more clearly demonstrated. Among non-users of women's illness services in 1971, for example, the program family planning acceptance rate was 57 percent among prior users of modern methods and only 28 percent among non-prior users. Use of health services raised the acceptance rate 79 percent in the former case and from 28 to 48 percent in the latter case of non-prior users. Prior use of traditional methods produced intermediate results.

Generally, similar patterns were observed in other health service categories. Overall, the results tend to reconfirm the effects of both prior use of family planning and program use of health services on program family planning practice. Are these effects separate and independent, however? The χ^2 values of Table 4.7 suggest that they may not be in that the effect of health services use invariably produced more significant χ^2 values among non-prior users of family planning than among prior users of

Table 4.7

RELATIONSHIP OF PROGRAM FAMILY PLANNING PRACTICE
TO PRIOR FAMILY PLANNING PRACTICE AND USE OF HEALTH SERVICES (1971)

	Type of Health Service					
	Use of Illness Care (Clinic)			Use of Other Care		
	No	Yes	χ^2	No	Yes	χ^2
<u>WOMEN'S SERVICES</u>						
No Prior FP (n)	240	409		206	443	
% with Pgm FP	27.9	47.7	24.53 (p<.001)	18.4	50.6	60.26 (p<.001)
Prior Trad FP (n)	122	290		101	311	
% with Pgm FP	40.2	53.8	6.38 (p<.05)	34.7	54.7	12.21 (p<.001)
Prior Modern FP (n)	44	141		67	118	
% with Pgm FP	56.8	78.7	8.26 (p<.01)	74.6	72.9	0.07 n.s.
<u>CHILDREN'S SERVICES</u>						
No Prior FP (n)	144	356		204	296	
% with Pgm FP	20.8	52.2	41.23 (p<.001)	19.6	59.5	78.16 (p<.001)
Prior Trad FP (n)	93	282		145	230	
% with Pgm FP	34.5	54.8	10.23 (p<.001)	24.1	66.1	62.60 (p<.001)
Prior Modern FP (n)	33	89		57	65	
% with Pgm FP	51.5	74.2	5.67 (p<.05)	59.6	75.4	3.46 n.s.

modern methods. In fact, use of "other" health services produced a negligible, or at least non-significant increase in program acceptors of family planning among prior users of modern methods.

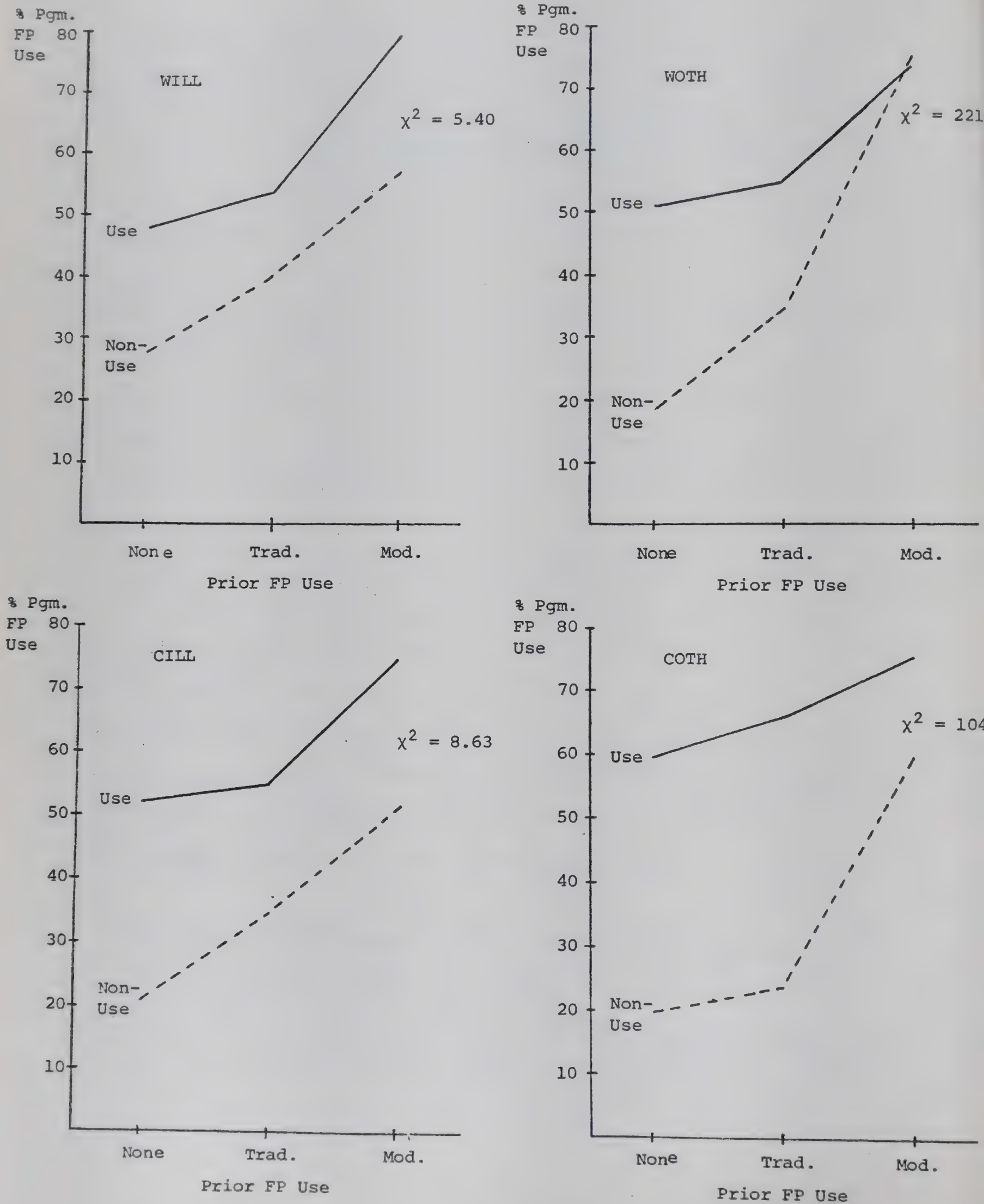
The independence question is examined more closely in Figure 4.2. If the effect of health services use were constant, regardless of prior experience with family planning, each pair of curves in the figure would be parallel. That is, the solid line representing health services users, would uniformly lie at a fixed distance above the broken line for non-users. Such a pattern is not observed among users of "other" health services.

Deviations from expected results, hypothesizing independence, have been tested quantitatively to produce the X^2 values indicated in the figure. Consider results for use of women's illness services to illustrate the procedure. Disregarding prior experience with family planning, non-users of women's illness care exhibited a 35 percent rate of program use of family planning. In contrast, illness care users had a 55 percent acceptance rate. Hypothesizing a constant 20 percent (55-35) effect of health services use, one would expect the acceptance rate among non-prior users of family planning to go from 28 to 48 percent with receipt of health services. Similarly, use of health services should have produced acceptance rates of 60 and 77 percent for prior traditional and modern users of family planning respectively. Comparison of actual results with these expectations yields a X^2 of 5.40.

Application of the procedure to all health services categories confirms dramatically the difference in effect between "illness" and "other" services. The latter should definitely be provided with prior family planning experience in mind.

Figure 4.2

GRAPH OF RELATIONSHIPS BETWEEN PROGRAM FAMILY PLANNING, PRIOR
FAMILY PLANNING AND HEALTH SERVICE USE



Although the χ^2 values associated with illness care are quite small, they do suggest a somewhat unique characteristic of prior users of traditional methods of family planning. In the absence of illness care, such women were more likely than non-users to become program acceptors. Among health service users, however, there was little difference between non-prior users and traditional users in program acceptance of family planning. Thus, the incremental effect of health services use per se on family planning acceptance was relatively small for those with previous experience with traditional methods. Graphically, this is exhibited in Figure 4.2 through steeper slopes for non-users of illness care than for users.

We have seen that prior experience with family planning affected the rate of utilization of program health services. Use of health services in turn affected the likelihood of program acceptance of family planning, apart from the effect of earlier experience with family planning. What was the impact of this double-barreled influence of prior experience? This question is investigated in Table 4.8.

Consider the case of women's illness services, for example. From Table 4.7 we note that 409 out of 649 (63 percent) of non-prior users of family planning were recipients of women's illness care in 1971. The earlier table also suggests that users of illness care had a program family planning practice rate 19.8 percent (47.7 - 27.9) higher than non-recipients of such health services. Thus, for every 1000 women without prior experience with family planning, 630 were reached with illness care and these 630 contributed 125 family planning acceptors in addition to those who could have been expected to become program acceptors in the

Table 4.8

ESTIMATED NET EFFECT OF HEALTH SERVICES ON
PROGRAM USE OF FAMILY PLANNING

Prior Family Planning	n	Added Users per 1,000 Pop. *
WILL		
None	649	125
Traditional	412	97
Modern	185	168
WOTH		
None	649	219
Traditional	412	150
Modern	185	0
CILL		
None	500	224
Traditional	375	155
Modern	122	164
COTH		
None	500	236
Traditional	375	256
Modern	122	82

*Numbers reflect relative magnitudes only. They are not additive across services because separate analyses did not examine service inter-relationships.

absence of illness care. The results of similar calculations for all categories of clients identified in Table 4.7 are summarized in Table 4.8.

The results are not statistically definitive; in particular they do not consider interactive effects of various service combinations. Nevertheless, the findings suggest possible guidelines for programmatic emphasis. The effect of illness care on family planning acceptance is relatively uniform, regardless of prior experience with family planning. Although the incremental effect of health services use is reduced by prior practice of family planning, the increased likelihood of health services use in this population group provides a larger sub-group of users from which to obtain the reduced benefit per capita. This is illustrated below in the case of non-prior users and traditional users being offered women's illness care.

<u>Prior FP Experience</u>	<u>Hypothetical Population</u>		<u>Users of WILL Services</u>	<u>Incremental Effect on FP Use</u>		<u>Resulting Gain</u>
None	(100)	x	(.630)	x	(.198)	= 12
Traditional	(100)	x	(.704)	x	(.136)	= 10

Making children's other services available to prior users of modern methods of family planning produced an effect on program use of family planning that was only about half as large as that from making illness care available. On the other hand, children's other care had approximately three times as much effect among those without prior family planning experience as among former modern users. Similar relationships of effectiveness are observed with regard to women's services. These variations of service

impact have specific implications for targeting of services when attempting to maximize family planning practice. In integrated health and family planning programs these efforts would have to be balanced by possibly competing demands for a different distribution of the services to maximize their health impact. Fortunately, as we found in Narangwal prior non-users of family planning tend also to be those who need health care the most.

POP MONOGRAPH

CHAPTER 5

MULTIPLE DETERMINANTS OF FAMILY PLANNING USE

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Previous sections of the monograph have established the strong association between utilization of health services and family planning practice and the influence of predisposing factors such as attitudes, beliefs and socioeconomic characteristics (AB/SE) upon use of services or practice of family planning. Since services were the primary intervention variables in the experimental study it was recognized that it was important to determine the strength of their association with family planning practice while controlling for the known effect of initial AB/SE characteristics on family planning practice. Thus, for example, it would be important to be able to determine whether services were potentially capable of inducing similar changes in use of family planning among women with different attitudes towards family planning or whether services affected disapprovers differently than approvers. The results would then be useful in identifying women with specific predisposing characteristics who would either be more or less responsive to the effects of service interventions in order to determine program priorities for these target groups. In addition the finding that a given predisposing characteristic had no influence on the impact of services could either indicate that it was an unimportant factor, or that the services were delivered in such a manner that the factor's initial influence was

effectively neutralized.

The initial analyses in this chapter therefore examine the simultaneous AB/SE, services, and family planning association. All attitude, belief and socioeconomic variables included in this analysis were obtained from the mid-project cross-sectional surveys (1971). Services and family planning practice variables represented the experience of individuals throughout the project (1969-1973).

1. Women's and Children's Health Services

In Tables 5.1 through 5.8 the percent of women who practiced family planning at some time during the project has been related to their use (or their children's use) of health services, given specific AB/SE characteristics. In each table women's and children's services have been expressed as "no use" throughout the project, use in either 1969-71 or 1972-73 ("some use") and use in both time periods ("full use"). Each of these three categories have been used to subdivide women with specific response categories for each AB/SE variable. For example, in Table 5.1 about 30 percent of women who disapproved of family planning and did not use illness care services actually practiced family planning sometime during the project. (In these cases, when family planning practice was associated with stated disapproval of family planning in 1971, the practice had occurred about as often before as after 1971.) Of those who approved of family planning, but didn't use illness care services, 42 percent practiced family planning. This compares quite closely to those women who stated they did not approve of family planning but used illness care in 1969-71 and 1972-73 (47 percent practiced family planning). In the

most favorable circumstances when women reported approval of family planning and used illness care services throughout the project, a family planning practice rate of over 60 percent was achieved. This is twice the rate for the "disapprove-non-user" and three times the rate of the "uncertain-non-user" women. As mentioned in Chapters 2 and 3, women with an uncertain attitude toward family planning actually appeared more negative to project services than "disapprovers." The effects on family planning practice of use of services while holding attitudes about family planning constant were statistically significant among approvers and women who were uncertain. It did not reach significance among disapprovers, even though the direction of change associated with use of services was positive and on the order of 17 percentage points. The impact on family planning practice of women's other services as well as both curative and other services for children was consistently strong among all women including disapprovers. Other care services for children (preventive and surveillance visits) produced the widest spread in family planning practice rates. Examining the last column in Table 5.1 it can be seen that moving from disapproval to approval within a use category or from one use category to the next higher category, with the attitude held constant, involved an approximate increase in 20-30 percentage points in either case. It appears therefore that the effects of attitudes toward family planning and children's other care services, or any of the women's or children's services are additive and at least partially independent from each other. It is also apparent that the impact of services was very similar no matter what the women's attitude was except for women's illness care among disapprovers of family planning.

RELATIONSHIP BETWEEN USE OF HEALTH SERVICES, APPROVAL OF FAMILY PLANNING AND THE
PERCENT OF WOMEN PRACTICING FAMILY PLANNING DURING THE PROJECT

WOMEN'S SERVICES

CHILDREN'S SERVICES

AB/SE Factor: APPR	Amount of Service Use	Illness Care			Other Care			Illness Care			Other Care		
		n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2
Disapprove	No Use	37	29.7		20	20.0		27	11.1		45	15.6	
	Some Use*	48	33.3	5.42 (n.s.)	38	28.9		51	17.6		62	25.8	25.30 (p<.001)
	Full Use**	191	46.6		218	46.3		160	50.5		131	52.7	
Uncertain	No Use	48	20.8		41	4.9		35	8.6		52	5.8	
	Some Use*	52	28.8	11.87 (p<.001)	47	27.7		50	30.0		75	33.3	
	Full Use**	167	45.5		179	48.0		128	41.4		86	50.0	
Approve	No Use	105	41.9		86	25.6		105	23.8		169	23.7	
	Some Use*	155	47.1	18.32 (p<.001)	163	53.4	38.18 (p<.001)	188	41.5	79.93 (p<.001)	233	48.9	62.72 (p<.001)
	Full Use**	626	60.4		637	60.6		554	65.6		445	70.1	

*Use in 1969-71 or 1972-73

**Use in 1969-71 and 1972-73

Note: Absence of chi-square test indicates that at least one cell was less than 5.

Table 5.2 demonstrates an equally dramatic additive effect between TALK and use of services. Again, use of children's other care services produced the most consistent findings. For example, family planning practice rates for non-users of services ranged from 12 percent for women who didn't talk with their husbands to 35 percent for those who did talk. In contrast, women who didn't talk with their husbands but whose children received other care services part of the time had a practice rate of 34 percent. In both cases a change in behavior was related to an increase in the family planning practice rate of around 20 percentage points. All of these changes are statistically highly significant and just as important, changes of such magnitude should have great practical significance. It is interesting to note that the TALK variable, more than any AB/SE variable, contributed to differences in family planning practice about equally as much as services. In the case of women's illness service, it's independent contribution is slightly greater than the independent contribution of that particular service (Table 5.2). These findings again support the importance of communication between wife and husband about family planning.

Differences in beliefs about changes in the frequency of child deaths over the previous 30 years produced only small variations in family planning practice rates in any given category of health service use (Table 5.3). The least effect was noted among women (or their children) who used services throughout the project ("full use"). In contrast, within any given belief category, practice rates of family planning were consistently and significantly related to the level of use of health services. It is particularly important to realize that services had a very strong effect on family plan-

Table 5.2

RELATIONSHIP BETWEEN USE OF HEALTH SERVICES, TALKING TO HUSBANDS ABOUT FAMILY PLANNING
AND THE PERCENT OF WOMEN PRACTICING FAMILY PLANNING DURING THE PROJECT

AB/SE Factor: TALK	WOMEN'S SERVICES						CHILDREN'S SERVICES					
	Illness Care			Other Care			Illness Care			Other Care		
	Amount of Service Use	n	% Using FP	χ^2	n	% Using FP	n	% Using FP	χ^2	n	% Using FP	χ^2
No	No Use	130	26.2		101	11.9	105	9.5		184	12.0	
	Some Use*	153	31.4	26.50 (p<.001)	164	31.1	180	26.7	69.94 (p<.001)	221	33.9	96.40 (p<.001)
	Full Use**	571	47.1		589	48.9	449	49.2		329	55.3	
Yes	No Use	60	51.7		40	37.5	61	34.4		79	35.4	
	Some Use*	101	57.4	6.91 (p<.05)	81	72.8	108	50.0	37.46 (p<.001)	150	53.3	45.29 (p<.001)
	Full Use**	410	66.6		450	64.0	392	70.2		332	72.9	

*Use in 1969-71 or 1972-73

**Use in 1969-71 and 1972-73

Table 5.3

RELATIONSHIP BETWEEN USE OF HEALTH SERVICES, BELIEFS ABOUT CHILD SURVIVAL AND THE
PERCENT OF WOMEN PRACTICING FAMILY PLANNING DURING THE PROJECT

AB/SE Factor: DIE	WOMEN'S SERVICES						CHILDREN'S SERVICES					
	Illness Care			Other Care			Illness Care			Other Care		
	Amount of Service Use	n	% Using FP	χ^2	n	% Using FP	Amount of Service Use	n	% Using FP	n	% Using FP	χ^2
MORE	No Use	45	33.3		31	19.4	No Use	33	15.2	58	13.8	
	Some Use*	42	23.8	15.04 (p<.001)	35	40.0	Some Use*	58	22.4	72	34.7	22.75 (p<.001)
	Full Use**	158	53.8		179	50.3	Full Use**	140	55.7	101	62.4	37.82 (p<.001)
SAME	No Use	92	34.8		69	20.3	No Use	63	11.1	101	13.9	
	Some Use*	128	44.5	11.88 (p<.001)	118	43.2	Some Use*	139	38.8	173	41.6	53.46 (p<.001)
	Full Use**	481	53.2		514	54.5	Full Use**	398	57.5	326	62.6	77.67 (p<.001)
LESS	No Use	56	32.1		48	16.7	No Use	71	26.8	108	25.9	
	Some Use*	89	43.8	15.55 (p<.001)	98	48.0	Some Use*	97	37.1	132	45.5	38.27 (p<.001)
	Full Use**	362	57.5		361	58.2	Full Use**	315	61.6	243	66.3	51.39 (p<.001)

*Use in 1969-71 or 1972-73

**Use in 1969-71 and 1972-73

ning practice, no matter what women believed about changes in survival rates of children. The effect was most dramatic for women provided with services throughout the project. This is extremely relevant to the project hypothesis that provision of services could be a potent educational tool in modifying women's beliefs or actions based on their perception of the chances their children had of surviving.

When the socioeconomic characteristics of women (caste, income, ownership of land or selected modern possessions, and husband's education) were held constant, associations between use of both women's and children's services and family planning practice remained highly significant (Table 5.4 through 5.8). In most cases a change from "no use" to "full use" of services was associated with an increase in percent of women practicing family planning of 20-40 percentage points. The only times that services were not observed to effect family planning practice as strongly were with women's illness care services among women with no land or medium income or of low caste. In contrast, in only a few instances was any effect of these SE characteristics noted on family planning practice when services were held constant. In general, these exceptions involved use of children's services. For example, among women whose children used illness care (clinic) services during part of the project ("some use"), family planning practice rates of women whose husbands had under six years of education were 20 percentage points lower than those with husbands having six or more years of education (29 percent versus 49 percent - Table 5.8).

In summary, the use of health services was much more strongly associated with family planning practice than the socioeconomic variables were, and probably overcame most of the pre-existing differentials in family planning use related to these characteristics. Almost invariably in the

RELATIONSHIP BETWEEN USE OF HEALTH SERVICES, CASTE AND PERCENT
OF WOMEN PRACTICING FAMILY PLANNING DURING THE PROJECT

AB/SE Factor: RCAST	WOMEN'S SERVICES						CHILDREN'S SERVICES					
	Illness Care			Other Care			Illness Care			Other Care		
	Amount of Service Use	n	% Using FP	χ^2	n	% Using FP	n	% Using FP	χ^2	n	% Using FP	χ^2
Low	No Use	76	40.8	6.86 (p<.05)	34	11.8	57	15.8	43.71 (p<.001)	76	14.5	57.64 (p<.001)
	Some Use*	77	41.6		76	36.8	101	29.7		103	31.1	
	Full Use**	324	54.0		367	56.1	318	55.7		297	58.2	
High	No Use	106	31.1	35.52 (p<.001)	99	21.2	104	20.2	70.63 (p<.001)	181	21.5	108.51 (p<.001)
	Some Use*	155	36.8		169	48.5	184	38.0		266	45.5	
	Full Use**	651	56.1		644	54.7	513	60.6		354	68.4	

*Use in 1969-71 or 1972-73

**Use in 1969-71 and 1972-73

Note: Absence of chi-square test indicates that at least one cell was less than 5.

Table 5. 5

RELATIONSHIP BETWEEN USE OF HEALTH SERVICES, HOUSEHOLD INCOME AND
PERCENT OF WOMEN PRACTICING FAMILY PLANNING DURING THE PROJECT

AB/SE Factor; INC (Rs)	WOMEN'S SERVICES						CHILDREN'S SERVICES					
	Illness Care			Other Care			Illness Care			Other Care		
	n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2
<1894	No Use	68	36.8	50	16.0	9.73 (p<.01)	43	14.0	46.36 (p<.001)	61	19.7	44.97 (p<.001)
	Some Use*	73	39.7	73	39.7		65	26.2		91	34.1	
	Full Use**	309	54.0	327	56.3		249	59.8		205	62.9	
1894-6500	No Use	39	46.2	20	25.0	3.76 (n.s.)	49	16.3	42.10 (p<.001)	78	15.4	54.75 (p<.001)
	Some Use*	60	36.7	65	36.9		99	29.3		115	36.5	
	Full Use**	227	50.7	241	52.3		248	57.7		203	62.1	
>6500	No Use	45	26.7	41	24.4	26.84 (p<.001)	37	27.0	12.98 (p<.001)	77	26.0	36.40 (p<.001)
	Some Use*	57	35.1	64	48.4		81	51.9		116	53.4	
	Full Use**	288	61.1	285	58.6		223	58.7		148	68.2	

*Use in 1969-71 or 1972-73

**Use in 1969-71 and 1972-73

RELATIONSHIP BETWEEN USE OF HEALTH SERVICES, OWNERSHIP OF LAND AND THE
PERCENT OF WOMEN PRACTICING FAMILY PLANNING DURING THE PROJECT

		WOMEN'S SERVICES						CHILDREN'S SERVICES					
AB/SE Factor: LAND	Amount of Service Use	Illness Care			Other Care			Illness Care			Other Care		
		n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2
No	No Use	90	42.2		48	18.8		64	15.6		97	17.5	
	Some Use*	104	38.5	9.95 (p<.01)	106	38.7	29.07 (p<.001)	133	30.1	16.38 (p<.001)	148	33.1	75.45 (p<.001)
	Full Use**	384	53.9		424	55.4		380	58.4		332	62.0	
Yes	No Use	79	27.8		76	19.7		85	21.2		147	21.1	
	Some Use*	113	35.4	33.20 (p<.001)	126	48.4	32.36 (p<.001)	141	41.1	43.74 (p<.001)	210	47.6	77.37 (p<.001)
	Full Use**	557	56.0		547	54.5		416	58.2		285	65.6	

*Use in 1969-71 or 1972-73

**Use in 1969-71 and 1972-73

Table 5 .7

RELATIONSHIP BETWEEN USE OF HEALTH SERVICES, NUMBER OF HOUSEHOLD POSSESSIONS
AND THE PERCENT OF WOMEN PRACTICING FAMILY PLANNING DURING THE PROJECT

AB/SE Factor: POSSES	WOMEN'S SERVICES						CHILDREN'S SERVICES					
	Illness Care			Other Care			Illness Care			Other Care		
	n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2
<2 Items	No Use	85	36.5	50	14.0		56	19.6		89	15.7	
	Some Use*	93	35.5	97	36.1	11.95 (p<.001)	94	29.8	32.52 (p<.001)	119	30.3	30.63 (p<.001)
	Full Use**	392	51.5	423	53.0		326	52.5		268	59.7	64.77 (p<.001)
>2 Items	No Use	67	35.8	61	26.2		72	18.1		126	23.8	
	Some Use*	97	39.2	105	46.7	22.29 (p<.001)	150	39.3	25.22 (p<.001)	202	48.5	65.44 (p<.001)
	Full Use**	428	59.3	426	58.9		394	64.0		288	68.1	70.83 (p<.001)

*Use in 1969-71 or 1972-73

**Use in 1969-71 and 1972-73

RELATIONSHIP BETWEEN USE OF HEALTH SERVICES, HUSBAND'S EDUCATION AND
THE PERCENT OF WOMEN PRACTICING FAMILY PLANNING DURING THE PROJECT

AB/SE Factor: HEDUC	WOMEN'S SERVICES						CHILDREN'S SERVICES					
	Illness Care			Other Care			Illness Care			Other Care		
	n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2	n	% Using FP	χ^2
0-5 Years	No Use	37.8	18.69 (p<.001)	88	21.6	34.12 (p<.001)	106	19.8	68.67 (p<.001)	177	18.1	93.57 (p<.001)
	Some Use*	41.1		173	46.8		181	29.3		242	39.3	
	Full Use**	54.5		718	54.2		540	55.4		408	60.3	
>6 Years	No Use	31.4	15.61 (p<.001)	33	27.3	11.28 (p<.005)	43	23.3	31.30 (p<.001)	68	26.5	46.94 (p<.001)
	Some Use*	43.2		56	51.8		101	49.5		123	49.6	
	Full Use**	60.4		305	57.7		294	65.6		247	70.4	

*Use in 1969-71 or 1972-73

**Use in 1969-71 and 1972-73



few instances when services were not strongly associated with increases in family planning practice, these services involved women's illness care.

2. Family Planning Motivation of Husbands

General and motivational contacts with husbands by male family planning workers were also analyzed for possible associations with family planning use and the AB/SE variables (Table 5.9). For these analyses women were identified as having husbands who either did or did not receive such contacts. The results were just as dramatic as with women's and children's health services, with practice rates ranging from a low of 24 percent for women whose husbands had not been contacted and who did not talk about family planning to 69 percent for women whose husbands had been contacted by the family planning workers and who talked about family planning to each other. Women with husbands who had no such contacts but who talked to each other or "non-talkers" who had received family planning contacts practiced family planning at almost identical intermediate rates of 47-49 percent. Although the association between motivational contacts with the husband and family planning practice are very strong, the contacts could either be stimulating practice or could be a secondary result of interest in practice initiated by the man receiving the contacts. Certainly directionality of cause and effect has not been established.

The DIE variable or special socioeconomic factors had little influence on practice rates when male general and motivational contacts were held constant. However, these contacts remained highly associated with family planning practice when the other variables were held constant (Table 5.9).

In summary, these analyses of children's, women's and men's services

Table 5.9

RELATIONSHIP BETWEEN SERVICE CONTACTS OF MALE FAMILY PLANNING WORKERS,
ATTITUDES, BELIEFS, SOCIO-ECONOMIC FACTORS AND THE PERCENT OF WOMEN PRACT-
ICING FAMILY PLANNING DURING THE PROJECT

AB/SE Factor	Received Contacts	n	% Using FP	Significance χ^2
APPR	Disapprove	No	81	28.4
		Yes	195	47.7
	Uncertain	No	79	20.3
		Yes	188	45.2
	Approve	No	209	38.8
		Yes	677	61.2
DIE	More	No	52	25.0
		Yes	193	50.3
	Same	No	168	32.1
		Yes	533	54.6
	Less	No	152	35.5
		Yes	355	59.4
TALK	No	No	230	23.9
		Yes	624	47.4
	Yes	No	130	48.5
		Yes	441	67.8
RCAST	Low	No	114	35.1
		Yes	363	54.5
	High	No	237	32.9
		Yes	675	55.9
INC (Rs)	<1894	No	113	31.9
		Yes	337	54.9
	1894-6500	No	90	35.6
		Yes	236	52.1
	>6500	No	82	30.5
		Yes	308	59.4
LAND	No	No	140	33.6
		Yes	438	54.3
	Yes	No	185	31.4
		Yes	564	56.0
POSSES	< 2 items	No	142	29.6
		Yes	428	52.3
	> 2 items	No	143	35.7
		Yes	449	59.0
HEDUC	0-5 years	No	205	33.7
		Yes	774	54.3
	> 6 years	No	116	41.4
		Yes	278	59.7

indicate that the associations between use of services and family planning practice are generally independent from any AB/SE effects and in some cases the effects of services and AB/SE characteristics are additive, thus strongly supporting the importance of the relationship between provision of services and practice of family planning in the Narangwal setting. The data suggest that the program effect of services was equally strong at most AB/SE levels and that earlier biases in family planning practice related to AB/SE characteristics were minimized during the project. In terms of a trade-off between equitable coverage of different segments of a population with health services and the potential for the services to have an impact on the different segments, it would appear that the Natangwal project was able to achieve both benefits simultaneously. Health services were usually used equally by all groups in the population, while the influence of this use on increasing family planning practice was generally comparable in each group, no matter what the initial level of use was in that group.

Regression Analyses Examining Health Services Use and Family Planning Practice

In order to obtain a more comprehensive view of the relative importance of the many factors examined in detail in preceding sections, a linear multiple regression model using data from the villages receiving health and family planning services was developed to relate the dependent factor, family planning practice, to AB, KP, SE and demographic factors and use of services as independent variables.

Three regression analyses were conducted. In the first, the independent variables measuring specified types of services were defined simply as

non-use or use in one, two or three years of the period 1969-71. Actual number of service contacts from 1969-73 was used for the final two analyses. As in the previous section, the specific services included women's illness and other services, children's illness and other services, and male motivational contacts. These variables were considered to have direct program implications.

Measurement of contraceptive practice after the baseline cross-sectional surveys were restricted to those methods offered through program sources: vasectomy, tubectomy, injectable Depo-Provera, IUD, oral pill and condom. Simple use or non-use of one or more of these methods during the program was used as the dependent variable in the first two regression analyses. Duration of family planning practice in total days of use during the project was the dependent variable in the third regression analysis. Couples who had a vasectomy or tubectomy before the program would not have had an opportunity to accept a method through program sources, and were excluded from the analysis. Also, since out-migration and dissolution of marriage would be deterrents to acceptance of contraception, only those couples were included who were present in experimental villages and were currently married at the time of both of the cross-sectional surveys measuring AB/SE characteristics (c. 1969 and 1971).

The analyses were therefore conducted on 1,187 women between the ages of 15-49 years who fulfilled the above criteria and who provided complete information on all the variables.

The socioeconomic status, demographic, AB and KP variables in this analysis were considered exogenous (non-manipulable) but potentially

important determinants of family planning use and therefore of interest in the targeting of services. The exogenous variables selected were generally limited to those that showed some promise upon preliminary bivariate analysis. These were defined as follows for use in the regression analyses:

Socioeconomic Variables (SE)

- a. Religion and Caste (RCAST) - The dominant farming caste (Jat Sikhs), other high caste Sikhs and Hindus, and the low caste (primarily Ramdasia or scheduled Sikhs) were each separately identified as dummy variables.
- b. Husband's Occupation (HOCC) - Three categories were included as dummy variables, farmers (landowners), laborers (primarily agricultural, non-land owning) and others.
- c. Husband's Education (HEDUC) - Grouped into illiterate, less than 6 years of primary school, 6-10 years (secondary schooling), and more than high school education.

Demographic Variables (DEM)

Preliminary examination has shown that standard demographic variables such as age of women, child loss, and the number of surviving children were highly correlated among themselves but still important in explaining contraceptive use. These variables were used as follows:

- a. Women's age and number of surviving children (WASC) at the time of the first cross-sectional survey were combined to form four dummy variables:

Age < 35 years and ≤ 3 children
 Age ≥ 35 years and ≤ 3 children
 Age < 35 years and > 3 children
 Age ≥ 35 years and > 3 children

b. The child loss variable (LOSS) was defined as the number of live born children who had died prior to the first cross-sectional survey, and was coded as 0, 1, 2, 3+.

Attitudes and Beliefs (AB)

a. Attitudes toward family planning (APPR) were separately identified as three dummy variables: Approve, Uncertain and Disapprove.

b. Beliefs about changes in child survival (DIESURV) were combined to form an ordinal variable as follows: 1 = more children die or fewer survive; 2 = the same die or survive or the respondent was uncertain; and 3 = fewer children die or more survive.

c. Talk with the husband about family planning (TALK) was coded Yes or No.

Knowledge and Practice (KP)

a. Married women's awareness of modern family planning methods (AWARE) were coded Yes or No.

b. Use of any family planning method by couples before the start of service inputs in the Narangwal program (PRIOR), was ranked according to whether they had never used family planning (0); had used traditional methods only (1); or had used modern methods (2).

Results of the first regression analysis using these exogenous variables and the service intervention variables mentioned earlier are presented in Table 5.10.

Table 5.10

RESULTS OF THE MULTIPLE REGRESSION ANALYSIS EXAMINING SERVICE UTILIZATION
IN 1969-1971 AND ITS EFFECT ON USE OR NON-USE OF FAMILY PLANNING AT ANYTIME
DURING THE PROJECT (1969-1973)

Regression Coefficients and their Levels of Significance

Independent Variables	Coefficient	t-value	Level of Significance
Education of Husband	.0545	1.9	~.05
Occupation of Husband: Labor	.0076	0.2	n.s.
Farming	.0441	1.1	n.s.
Other	*	*	*
Religion-caste: Jat Sikh	-.0761	1.6	n.s.
Ramdasia and other low castes	-.0579	1.3	n.s.
Other	*	*	*
Living Children and Wife's Age: ≤ 3 and < 35	.1894	3.6	<.001
≤ 3 and ≥ 35	*	*	*
> 3 and < 35	.2788	4.7	<.001
> 3 and ≥ 35	.0997	1.9	~.05
Number of Children Dead	-.0305	2.1	<.05
Awareness of Modern Contraception	-.0324	0.6	n.s.
Prior Use of Contraception	.0847	4.2	<.001
Belief about Child Mortality	.0121	0.7	n.s.
Talk with Husband	.0893	3.2	<.005
Attitude toward Family Planning: Approval	.1206	3.1	<.005
Uncertain	*	*	*
Disapproval	.0463	1.1	n.s.
Service Utilization: Women's Illness	.0481	4.1	<.001
Women's Other	.0032	0.2	n.s.
Children's Illness	-.0199	1.1	n.s.
Children's Other	.1049	6.1	<.001
Male Motivation	.1022	5.3	<.001

$$R^2 = 0.24$$

* suppressed category; effect included in constant term

n.s.: not significant ($p > .05$)

1. SE Variables

Religion-caste and occupation were not significant, reflecting the success in achieving equitable distribution of contraceptive use in the population. Education of husband was slightly significant in the expected direction, the higher the husband's education the greater the contraceptive practice.

2. DEM Variables

There was more contraception among young women (less than 35 years) than older women. This was clarified by the number of surviving children. Among younger women, the contraception rate was higher for those who had more than three children than for those who had fewer children. This has obvious program implications in defining a particularly receptive target group for family planning.

A significant negative association was found between the number of liveborn children who had died and women's contraceptive practice - the fewer the children who died the greater the contraceptive practice, even for women with the same number surviving.

3. AB, KP Variables

Approval of family planning, belief about child mortality, talk with husband about family planning, awareness of modern contraception, and prior practice of reversible methods of family planning were included in this group of variables. Awareness of modern contraceptive methods was found in 93 percent of study women and obviously was not crucial in the subsequent contraceptive behavior. Approval of family planning, and communication with husbands did help subsequent contraceptive practice.

Beliefs about child-mortality were in the expected direction with contraceptive practice rate being greater among those who believed child mortality was less than 30 years ago. The fact that this belief variable was not significant in the regression analysis as it had been in the bivariate analysis is at least partially due to a small, but significant, correlation with actual child loss experience. Prior practice of reversible methods of family planning showed significant association with program contraception.

4. Service Input Variables

Utilization of all five service input variables during the first three years of the project was related to practice of family planning. Of special significance was utilization of women's illness services, children's other services and male motivational services.

From the preceding summary of results, we note that eight of the 20 variables proved statistically significant: age of mother and number of living children, number of children who died prior to the project, prior use of contraception, talk with husband, approval of family planning, and use of women's illness, children's other, and male motivation services.

To identify the balance of influences more concretely, we start with a hypothetical baseline population of average social status, awareness of modern contraception, belief about child mortality, and use of women's other services and children's illness services. Further, assume that the wives are less than 35 years of age, have no more than three living children, have had no child deaths, and are average in previous contraceptive use. The regression equation predicts that 9.8 percent of these baseline couples will become program contraceptive users without further program inputs.

Table 5.11

ADJUSTMENT FACTORS FOR SIGNIFICANT VARIABLES IN THE
REGRESSION ANALYSIS IN TABLE 5.10

Variable	Level/Category	Adjustment (%)
Living Children and Age	≤ 3 and <35	0.0
	≤ 3 and ≥ 35	-18.9
	> 3 and <35	+ 8.9
	> 3 and ≥ 35	- 9.0
Number of Child Deaths	0	0.0
	1	- 3.0
	2	- 6.1
	3 or more	- 9.2
Prior Family Planning Practice	None	- 5.1
	Traditional only	+ 3.3
	Modern	+11.8

Since the last three factors mentioned in the preceding paragraph were statistically significant, different assumptions would alter the forecast of program contraceptive use, as indicated in Table 5.11. For example, if interest is centered on women under 35 with more than three living children and no previous family planning experience, the table indicates an expected program use rate of 13.6 percent ($9.8 + 8.9 - 5.1$) rather than 9.8 percent.

The result of the regression analysis summarized in Table 5.10 suggest that if in addition to the above baseline conditions husband-wife communication takes place, through program intervention or otherwise, program use of family planning can be expected to increase by 8.9 percent. When couples express approval of family planning, the use rate can be expected to increase by another 12.1 percent. These and the service input effects can be summarized as follows:

Baseline Use Rate		9.8 percent
Talk with husband	+ 8.9	
Family planning approval	+12.1	
Women's illness services One Year	+ 4.8	
Children's other services One Year	+10.5	
Male motivation services One Year	+10.2	
	<hr/>	
Hypothetical program effect	+46.5	
Modified use rate for one year of services		56.2 percent
Modified use rate for two years of services (+ 25.5)		81.8 percent

If all of the listed effects were present, the program family planning use rate would be expected to reach 56.3 percent, an increase of 46.5 percent over baseline conditions. Of the service variables, children's other services and male motivation services appear to be the most important. Assuming linearity of effects, use of the three types of services, in two years instead of one, would add another 25.5 percent to the family planning use rate, bringing it to 81.8 percent.

The set of variables used in the present analysis explains about 24 percent of variation in contraceptive practice. The unexplained variation could be attributed to variables not included in the present analysis and/or to non-linear components of variables already included. A part of the unexplained variation could also be due to interaction between variables not considered in the present analysis.

Figure 5.1 (a to g) show the relationship between contraceptive practice and a few of the explanatory variables. These relationships are aggregate in the sense that no adjustments have been made for the influence of other variables. The three variables, namely number of children who died; utilization of male motivation services; and education of husband seem to have fairly linear relationships with contraceptive practice. The relationships of women's illness services and children's other services are less linear while those of women's other services and children's illness services are far from linear, which may have influenced the fact that they did not appear as significant in the regression.

Figure 1
BIVARIATE RELATIONSHIP BETWEEN CONTRACEPTIVE USE AND SELECTED EXPLANATORY VARIABLES

Fig. a

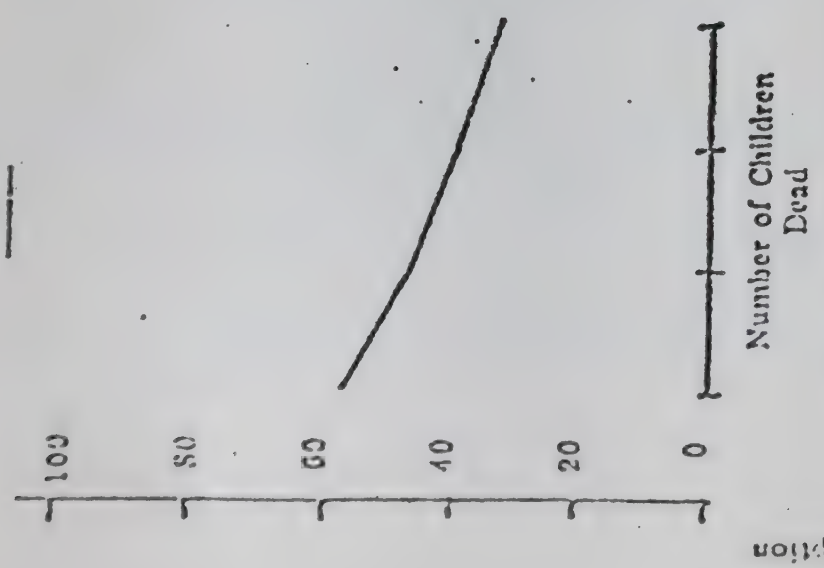


Fig. b



Fig. c



Fig. d

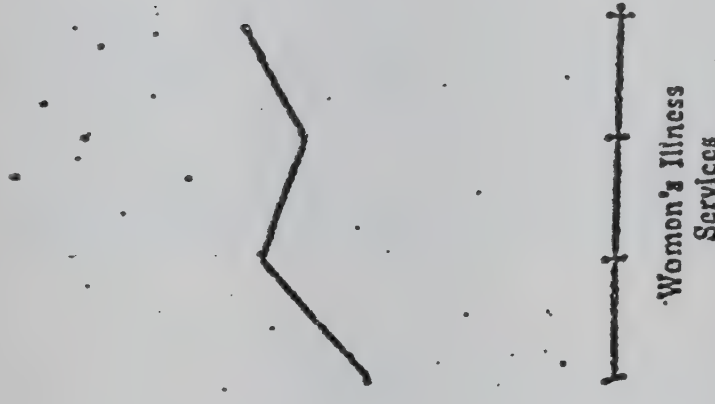


Fig. e



Fig. f

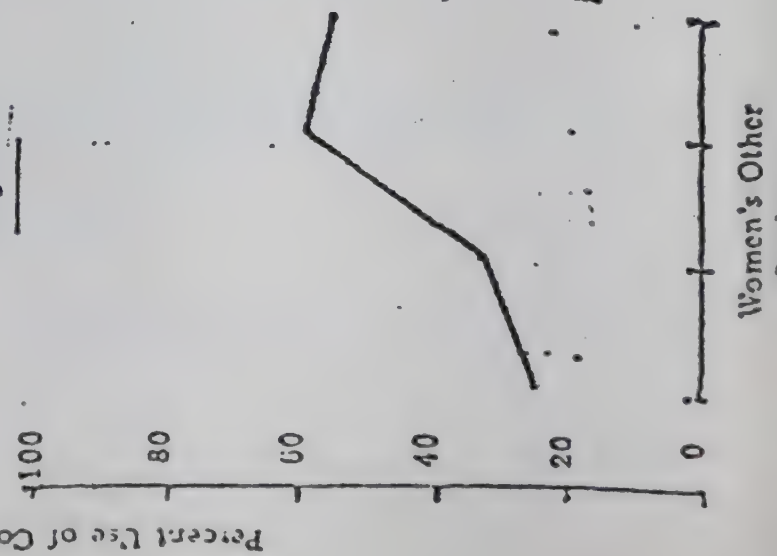
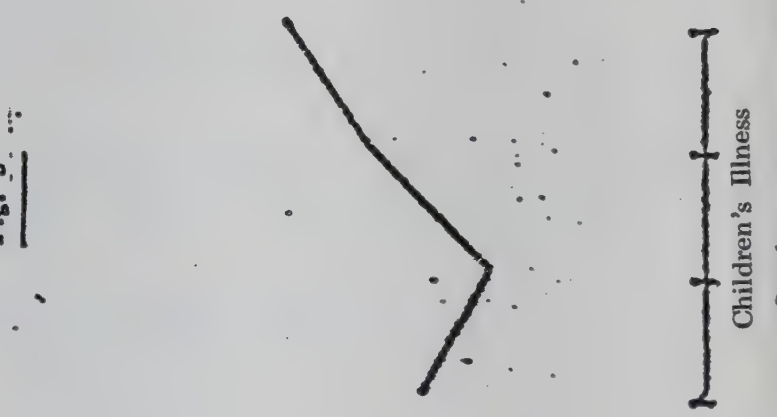


Fig. g



Regression Analysis Examining Volume of Service Contacts (1969-1973)
and Use or Non-Use of Family Planning

A second regression analysis was carried out incorporating the same variables as in the first regression except that services were expressed as the total number of contacts during the entire project. Contraceptive use or non-use during the project was again the dependent variable.

The relationships of the socioeconomic, demographic, AB and KP variables to contraceptive use remained essentially the same as in the first regression with the sign and approximate magnitude of the regression coefficients and the statistical significance basically unchanged. The two variables that lost their statistical significance were the number of live-born children who had died and the women who had more than 3 children and were over 35.

Major differences between the two analyses were found in the service input variables (Table 5.12). In this analysis the measure of services was changed from the initial regression in two ways: first the actual number of service contacts is introduced and not simply whether services were used in one or more years of the project, and second, service use during the whole project was considered and not just use for the first three years. All women's and children's services now have a significant and positive association with contraceptive use but male motivation is no longer significantly related. In fact, the latter has also changed signs from the first regression. Other changes from the first regression (Table 5.10) are the statistical significance and change in sign for children's illness services and the highly significant association of women's other services in the second regression.

Table 5.12

RESULTS OF THE MULTIPLE REGRESSION ANALYSIS EXAMINING THE VOLUME OF SERVICE CONTACTS IN 1969-1973 AND ITS EFFECT ON USE OR NON-USE OF FAMILY PLANNING AT ANY TIME DURING THE PROJECT (1969-1973)

Regression Coefficients and Their Levels of Significance			
Independent Variables	Coefficient	t-value	Level of Significance
Education of Husband	.0337	2.1	<.05
Occupation of Husband: Labor	.0082	0.2	n.s.
Farming	.0543	1.3	n.s.
Other	*	*	*
Religion-Caste: Jat Sikh	-.0800	1.8	n.s.
Ramdasia and other low castes	-.0474	1.1	n.s.
Other	*	*	*
Living Children and Wife's Age: <-3 and <35	.1810	3.4	<.001
<-3 and >-35	*	*	*
>3 and <35	.2568	4.4	<.001
>3 and >-35	.0885	1.7	n.s.
Number of Children Dead	-.0234	1.6	n.s.
Awareness of Modern Contraception	-.0296	0.6	n.s.
Prior Use of Contraception	.0704	3.5	<.001
Belief about Child Mortality	.0112	0.7	n.s.
Talk with Husband	.0671	2.4	<.02
Attitude toward Family Planning: Approval	.0799	2.1	<.05
Uncertain	*	*	*
Disapproval	.0307	0.8	n.s.
Service Contacts: Women's Illness (1969-1973)	.0026	5.0	<.001
Women's Other	.0071	5.8	<.001
Children's Illness	.0012	2.7	<.01
Children's Other	.0008	4.8	<.001
Male Motivation	-.0025	0.9	n.s.
$R^2 = 0.24$			

* suppressed category; effect included in constant terms

n.s. = not significant (p>.05)

The coefficients in the second regression are much smaller because service inputs were expressed in terms of individual contacts which were much more numerous. The coefficients, however, still can be interpreted as representing approximate increases in percent of contraceptive users in the population given an increased input of one unit (one contact or visit) of service per woman. In this context one contact involving women's other services is seen to have almost nine times the impact of one children's other service contact, while a visit for women's illness services is about twice as effective as a visit for care of a child's illness. However, when the impact of the total volume of services is examined based on the mean number of services received, a somewhat different picture emerges (Table 5.13). When the coefficient for each service variable is multiplied by the mean number of service contacts, the impact of children's other services in the project is shown to be as effective as women's illness services, but still not as important as women's other services. The latter were associated with a 14.4 percent increase in the probability of family planning acceptance, compared with a somewhat less than five percent increase associated with women's illness and children's other services. In this case the relative importance of the variables in explaining differences in contraceptive use is about the same as the ranking of "t" values (Table 5.12) or the beta coefficient, a normalized coefficient taking into account differences in standard deviations of the variables (see also Table 5.13).

Some possible explanations for the differences between the two regressions are:

1. Since most women received women's other services, the relatively

Table 5.13

MEAN NUMBER OF SERVICES AND ASSOCIATED REGRESSION COEFFICIENTS
FROM THE REGRESSION ANALYSIS IN TABLE 5.12

<u>Service Variable</u>	<u>Mean Number of Contacts (\bar{X})</u>	<u>Coefficients (B)</u>	<u>(B) x (\bar{X}) * x 100</u>	<u>Beta Coefficients</u>
Women's Illness	18.1	.0026	4.7	0.1472
Women's Other	20.3	.0071	14.4	0.1729
Children's Illness	21.6	.0012	2.6	0.0866
Children's Other	60.3	.0008	4.2	0.0973

* Estimated percentage increase in likelihood of family planning acceptance with average services utilization

simple indication of utilization or non-utilization of these services in the first regression obscured an effect which showed up very strongly in the second regression. Apparently the frequency of contacts for women's other services (which included motivation to accept family planning) was important in initiating contraceptive use.

2. Utilization of women's illness services was equally important no matter how these services were measured. Since illness is a random event and a visit for illness care is usually patient initiated, the availability and use of these services when needed seems to be as important as the frequency of their use.

3. If one assumes that a similar argument holds for children's illness services as with women's illness services, then the emergence of children's illness services in the second regression as an important explanatory variable may be related to the longer duration of the time period (1969-73) in the second regression as compared with the first (1969-71). This may indicate that the association of children's illness services with family planning practice was greater in the later stages of the project, possibly due to improved service linkages. There may also have been a cumulative effect of these services or a lag period between use of these services and their effect as postulated in our original statement of the child survival hypothesis.

4. Although still important in the second regression, children's other services had a relatively smaller effect than in the first analysis. This is probably related to the fact that in the FPCC experimental group the frequency of contacts was very high and strictly prescribed by the

requirements of the overlapping nutrition study. The number of prescribed contacts were significantly fewer in FPWSCC, but coverage of children in any given year by prescribed services was similar. Simple use or non-use of services was therefore probably a more appropriate measure across all experimental groups providing child care.

5. The fact that male motivation services lost significance in the second regression may also be time related. Motivational contacts may be quite effective in early stages when there are a large number of couples from whom to recruit acceptors. However, as candidates for ready recruitment decrease, the marginal effort to get a new acceptor may dramatically increase the motivational contacts required to recruit new acceptors. This seems to be born out by the bivariate analyses in Figure 5.2(c) which shows a curvi-linear relationship with male motivation up to a maximum of 5 to 10 contacts. The percentage of couples with 11 or more contacts who accepted family planning for the first time then falls off.

All the bivariate analyses of service variables used in the second regression analysis are summarized in Figure 5.2 (a to e). The analyses are all high significant, but as in the initial regression, the assumption of linearity only holds for both types of women's services. Of special interest are the children's services which are remarkably similar to Figures 5.1(e) and 5.1(g). The zero level of use of children's services was associated with a contraceptive use rate that was artificially high. The distortion in curves resulted from inclusion of women from villages not receiving children's care. This introduced an upward bias in the zero level contraceptive use rates as demonstrated in bivariate analyses limited to data from villages with children's services which produced essentially linear curves.

Figure a

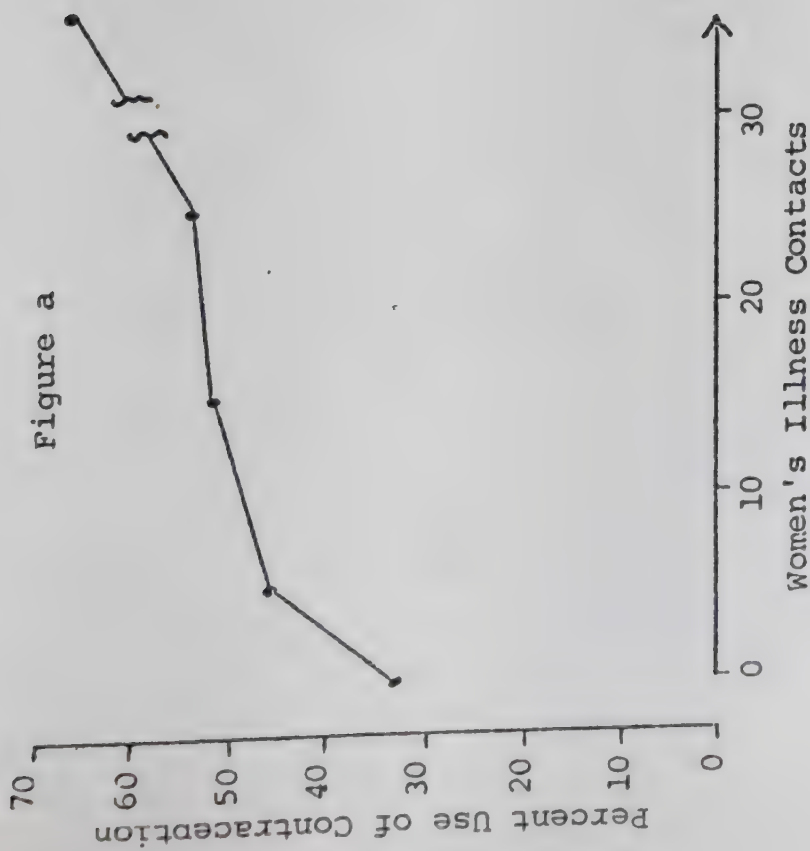


Figure b

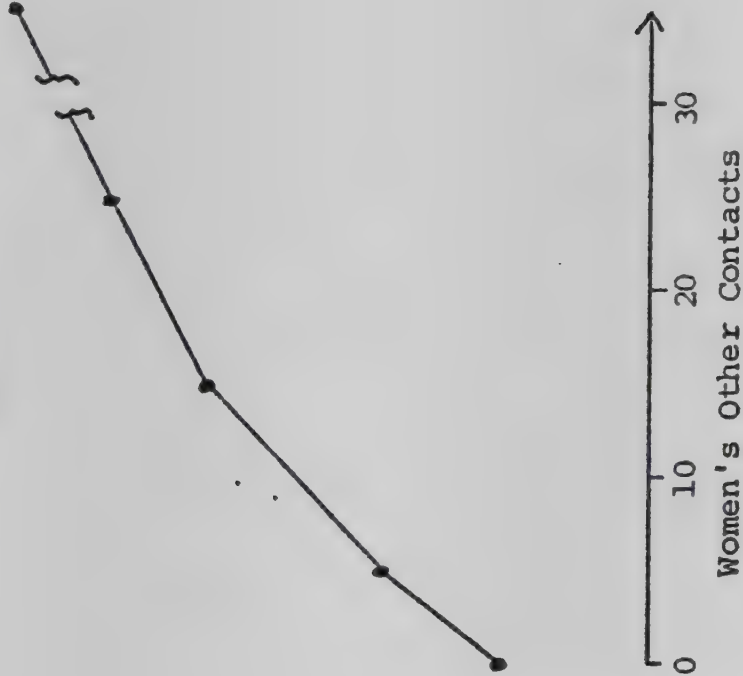


Figure c

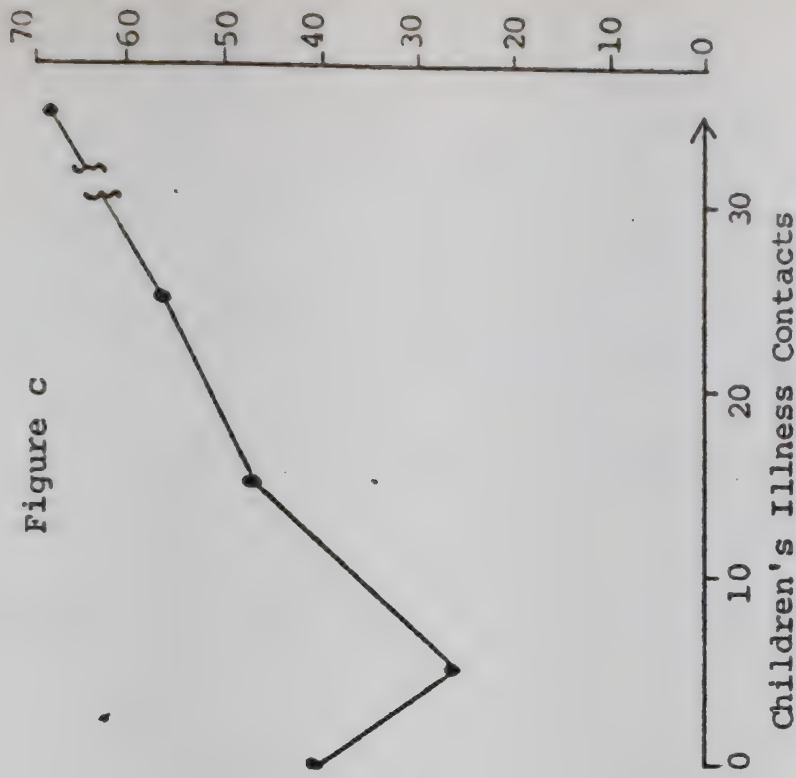


Figure d

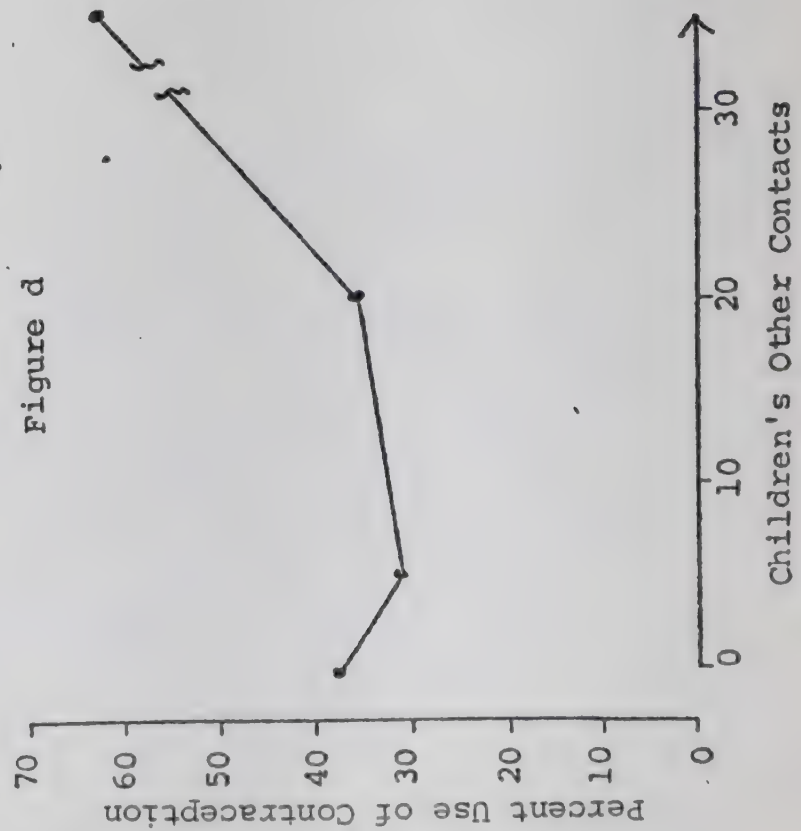
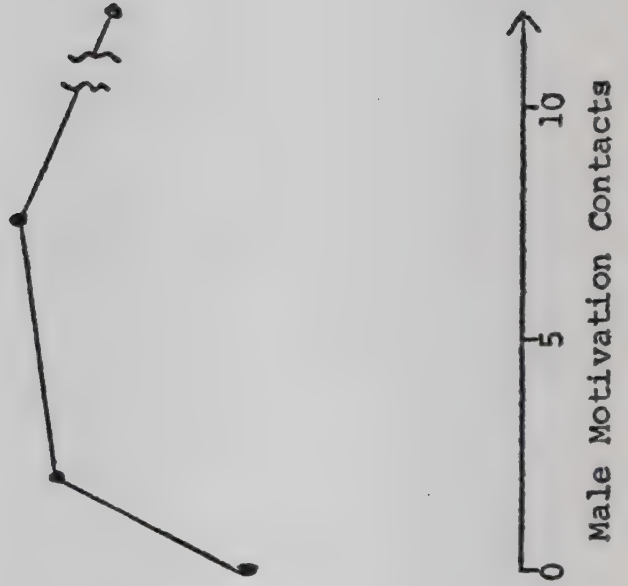


Figure e



Regression Analysis Examining Volume of Service Contacts (1969-73) and Duration of Contraceptive Use Among Family Planning Users

The third regression analysis examines the relationship of the 20 independent variables to the duration of modern contraceptive use in the entire program period among those who accepted contraception (non-acceptors were excluded). The data were expressed as total days of use, whether continuous or interrupted by periods of non-use, which provides a relatively broadly defined dependent variable. As in the second regression, services were defined as the number of service contacts received by the woman or her husband or children. The analysis included 559 women who practiced contraception during the project in villages receiving both health and family planning services. This is 29 women less than those identified as "users" in the previous regression since the duration definition excluded women whose duration of use was not known.

Table 5.14 summarizes the results of this regression analysis, while Figure 5.3 (a-e) gives the results of bivariate analyses between the service (independent) and dependent variables.

Among the "predisposing" variables (AB, KP, SE, DEM) which were found to be significantly associated with any use of family planning in the previous regressions, only prior use of contraceptives was found to relate significantly (and positively) to total days of contraceptive use during the project. This suggests that the following factors contribute to the initiation of use of family planning but are less important in maintaining contraceptive practice: age, parity, communication with husband and approval of family planning. The only predisposing variable which assumed significance in this regression which was not found to be significant in the two previous regressions is occupation of husband.

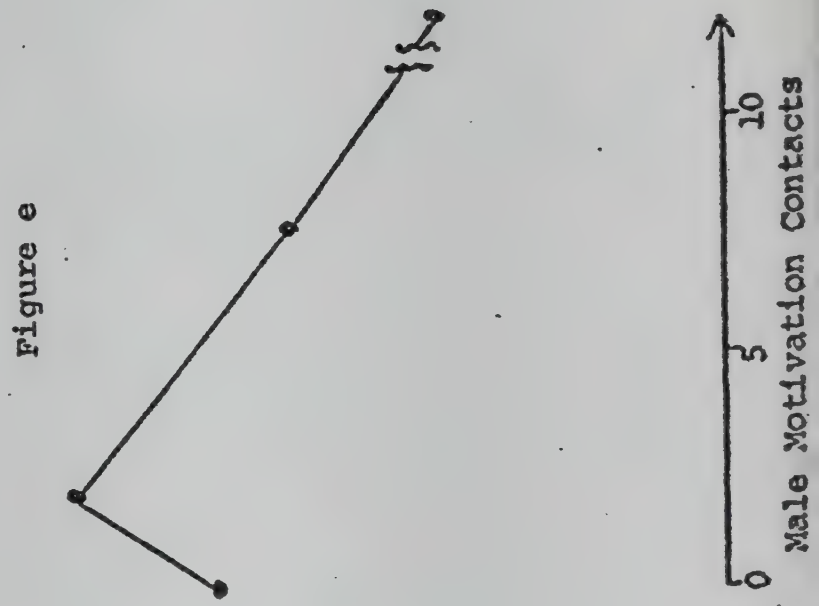
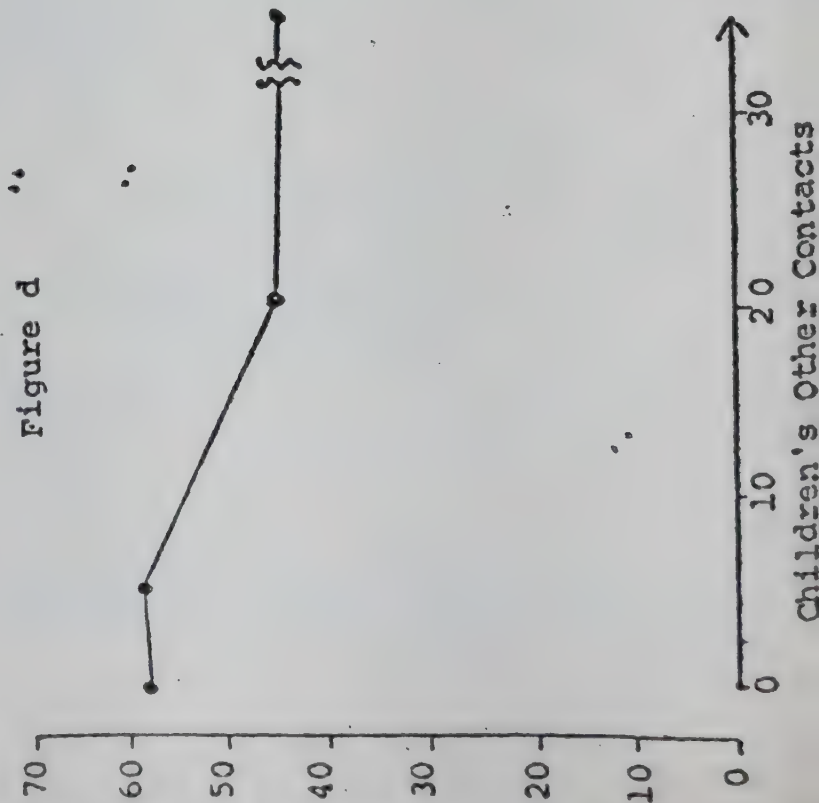
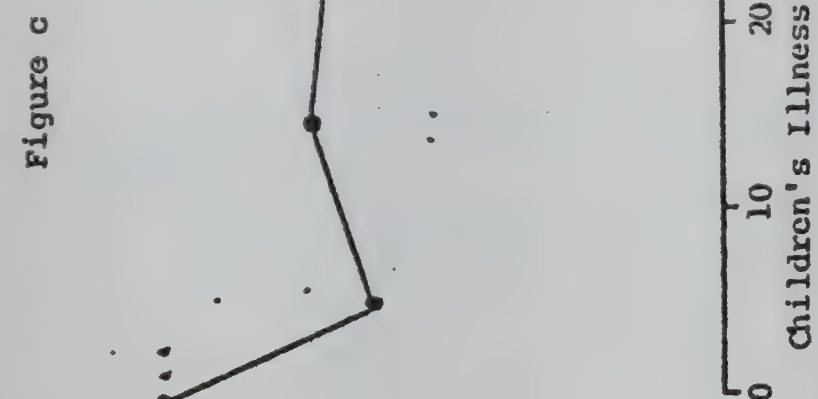
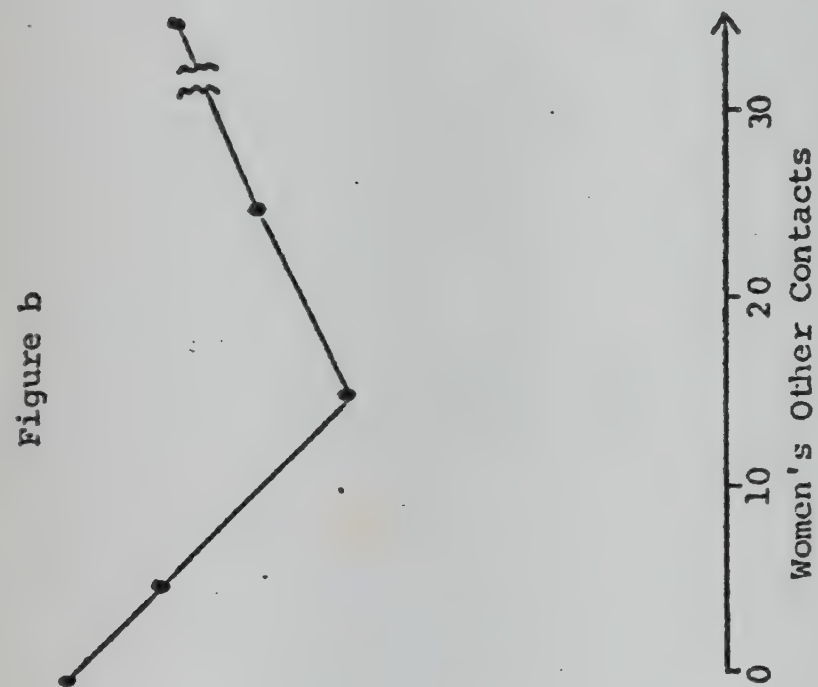
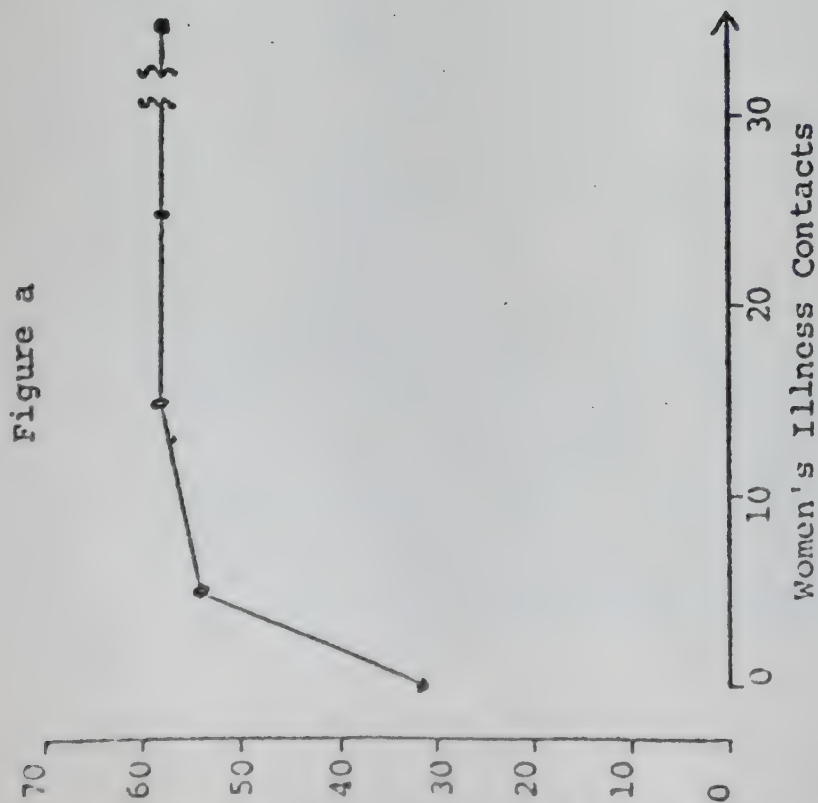
Table 5.14

RESULTS OF THE MULTIPLE REGRESSION ANALYSIS EXAMINING THE VOLUME OF SERVICE CONTACTS IN 1969-1973 AND ITS EFFECT ON THE DURATION OF FP USE AMONG ALL PROGRAM USERS

Independent Variables	Regression Coefficients and Their Level of Significance		
	Coefficient	t-value	Level of Significance
Education of Husband	36.53	1.4	n.s.
Occupation of Husband: Labor	153.78	2.3	<.05
Farming	165.65	2.4	<.02
Other	*	*	*
Religion Caste: Jat Sikh	39.87	0.5	n.s.
Ramdasia and other low castes	-52.46	0.7	n.s.
Other	*	*	*
Living Children and Age: <3 and <35	-68.58	0.5	n.s.
<3 and >35	*	*	*
>3 and <35	124.82	0.9	n.s.
>3 and >35	223.11	1.5	n.s.
Number of Children Dead	-15.40	0.6	n.s.
Awareness of Modern Contraception	**	**	**
Prior Use of Contraception	98.55	3.1	<.005
Belief About Child Mortality	-15.92	0.5	n.s.
Talk with Husband	21.00	0.4	n.s.
Attitude Toward Family Planning: Approval	124.41	1.7	n.s.
Uncertain	*	*	*
Disapproval	121.22	1.6	n.s.
Service Contacts: Women's Illness	* 1.83	2.2	<.05
(1969-1973) Women's Other	-3.88	1.7	n.s.
Children's Illness	0.51	0.8	n.s.
Children's Other	-1.03	3.9	<.001
Male Motivation	-21.82	4.4	<.001

$$R^2 = 0.23$$

* Suppressed category; effect included in constant term
 ** t-value or tolerance-level insufficient to enter regression
 n.s. = not significant ($p > .05$)



Both farming and laborer (basically agricultural) occupations were found to be positively associated with greater duration of use of contraception.

Three out of the five service variables were significantly associated with total days of contraceptive use. These results however must be interpreted with care since it is apparent from Figure 5.3 (a-e) that the relationships are not entirely linear. In the case of women's illness care, a positive effect on days of use was noted, while utilization of children's illness care services and women's other services had essentially no effect. The other services were negatively associated, a fact confirmed by the slope of the curves in Figures 5.3 (d) and 5.3 (e). Possible explanation for these relationships include the following:

1. There is a tendency among women who used contraceptives over longer periods of time to have used women's illness care services at least once. However, the frequency of this use does not appear to have an important impact on duration of use.

2. The number of women's other care services were reduced among women who were sterilized since we did not continue to monitor their menstrual cycles through the fertility survey once they were sterilized. Those women who were sterilized early in the project would have a high number of days of contraceptive use but fewer women's other care services. This may be the major explanation for the non-significant and negative association and the "u" shape of the curve in Figure 5.3(b). If women with fewer than 10 contacts are eliminated the relationship between volume of other care services and days of family planning use becomes positive and essentially linear.

3. Children's illness contacts, which are not significantly related to the dependent variable in this regression also would become more linear

and probably significantly and positively related if we excluded women from the analysis whose children had no access to child care services (e.g., women in the FPWS experimental group of villages.)

4. The negative relationship between children's other care services and days of family planning use may be caused by intentional or unintentional pregnancies interrupting contraceptive use among women who therefore had higher utilization of other care services for their additional children.

5. The very strong negative association between male motivation contacts and days of family planning use may be explained by the same phenomenon postulated in the previous regression where acceptance of family planning was low among couples who had a large number of contacts due either to inherent greater resistance or because they delayed their acceptance to the end of the project. The finding that as the number of contacts increased the average duration of use decreased may reflect the fact that late acceptors would have less chance to use contraceptives for extended periods of time. It may also be due to the fact that male motivation workers tended to promote use of condoms, which had a shorter average duration of use after first acceptance than other temporary methods (12 months compared to 19 months).

POP MONOGRAPH

CHAPTER 6

ANALYSIS OF EFFICIENCY AND EQUITY

Robert L. Parker and R.S.S. Sarma

Some of the most difficult issues that policy makers and planners of health and family planning services must resolve involve balancing trade-offs among effectiveness, cost and equity considerations. Limited resources require efforts to maximize impact through increases in efficiency. Attempts to make distribution equitable, however, may dilute services so they have minimal effect. At Narangwal we found that focussing services on the most neglected or highest risk population groups achieved a balanced distribution of services as well as increasing service efficiency and therefore impact. In this chapter we make a case for integration and health and family planning services based on a description of time and cost inputs and calculations of efficiency expressed as time required per service contact, cost per service contact, and the cost/effectiveness of the different service combinations. The considerations of efficiency are then balanced by an examination of the project achievements in promoting equitable distribution of health services and use of family planning. In addition to the previously documented impact of services on family planning and health status, the data presented here demonstrates the achievement of both equity and efficiency within the Narangwal project.

Service Time

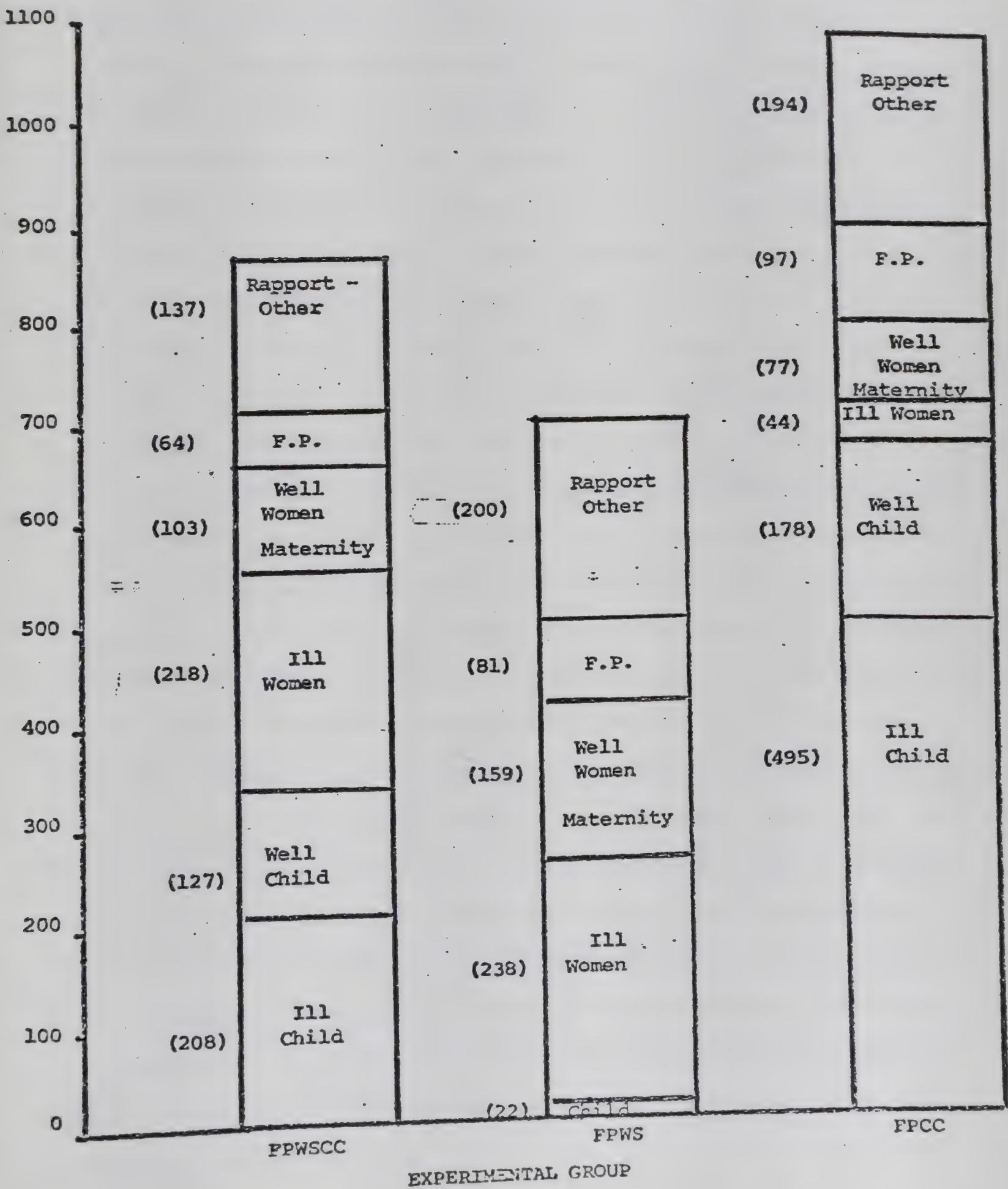
Work sampling observations were used to estimate the amount of time spent by project staff in carrying out the various components of services in each of the four experimental groups. In the original experimental design the decision was made to attempt to have equivalent personnel to population ratios even though the work load was quite different in the various groups of villages. Some variations did occur in the size of villages and in staffing so that it was necessary to standardize the results of the work sampling as time inputs per 1000 population per week.

Figure 6.1 shows for each of three experimental groups of villages the time spent on direct services at the midpoint of the project in 1971. (Services did not start in FPED villages until 1972.) The total direct service time provided by all project staff during an average week varied from 700 minutes per 1000 population in the family planning and women's service villages (FPWS), to almost 1100 minutes per 1000 population in villages receiving family planning and children's services (FPCC). The villages with the combination of all three services - family planning, women's services and children's services (FPWSCC) - had a total staff input of about 860 minutes.

The relatively higher level of inputs in the FPCC villages was related to the higher staff to population ratios required by the research activities of the nutrition project. These intensive child care services consumed twice as much staff time (673 minutes) when compared with similar services in the FPWSCC villages (335 minutes). Although the content of services was quite similar, the larger volume of child care services in FPCC was

Figure 6.1

Average Time Spent Providing Direct Services by All Staff* Working in Each
Experimental Group- 1971 - Minutes per Week per 1000 Population



* Excluding Village Attendants

associated with much more frequent surveillance contacts to collect information on nutritional status and infection (NUT Monograph). Although the design called for no child care services to be provided in FPWS villages or services for ill women in FPCC villages, it proved necessary to spend a little time in such activities to maintain rapport with village families, in cases of emergency or when these types of care could not be separated from other services. Examples of the latter include essential care of the newborn in the immediate postpartum period in FPWS, or care of a woman during pregnancy in FPCC as part of prenatal care of the child.

Unlike these differences in design of child care services, women's services in FPWSCC and FPWS villages were planned to be identical in content and frequency of routine contacts. In actual practice, staff in FPWS spent about 25 percent more time on women's services (397 minutes) than staff in FPWSCC (321 minutes). The time spent in care of ill women was almost the same suggesting that demand for clinical services produced a comparable response even though time constraints were different. The major differences between the two experimental groups was in routine surveillance and maternity care. As noted in Chapter 3, this difference resulted from increased frequency of contacts and as noted later in this chapter, more time spent per contact in FPWS villages. It also suggests that FHW's tended to use direct service time more efficiently in the FPWSCC villages because child care and women's services could be combined on one home visit. Care of women in FPCC villages required less time (77 minutes compared with 103 minutes in FPWSCC), and was devoted to surveillance to identify pregnant women early in pregnancy and when pregnant to provide "prenatal child care" focussing primarily on services needed to produce a healthy baby.

Family planning services took up 97 minutes in FPCC villages, 81 minutes in FPWS villages and 64 minutes in FPWSCC villages. This difference helps to explain how the combined services probably achieved greater efficiency as shown by cost/effectiveness calculations later in this chapter. Finally, time spent on contacts whose purpose was mainly to maintain good relations with individuals and communities was higher in FPWS (200 minutes) and FPCC (194 minutes) than in FPWSCC (137 minutes). This presumably reflects the additional time that was needed or available to maintain rapport in villages that did not receive complete services.

Seventy-six percent of direct service time in study villages was provided by the family health worker (FHW) residing in each village (averaging about one FHW per 1600 population in FPWSCC and FPWS villages and one FHW per 1000 population in FPCC villages). Approximately 70-75 percent of the FHW's activity time observed during work sampling was classified as service, with the remainder being research. These findings provide a basis for estimating that if Narangwal services were to be replicated in other similar locations and no time allocated to research activities, the worker to population ratios could be between 1:2000 and 1:3000.

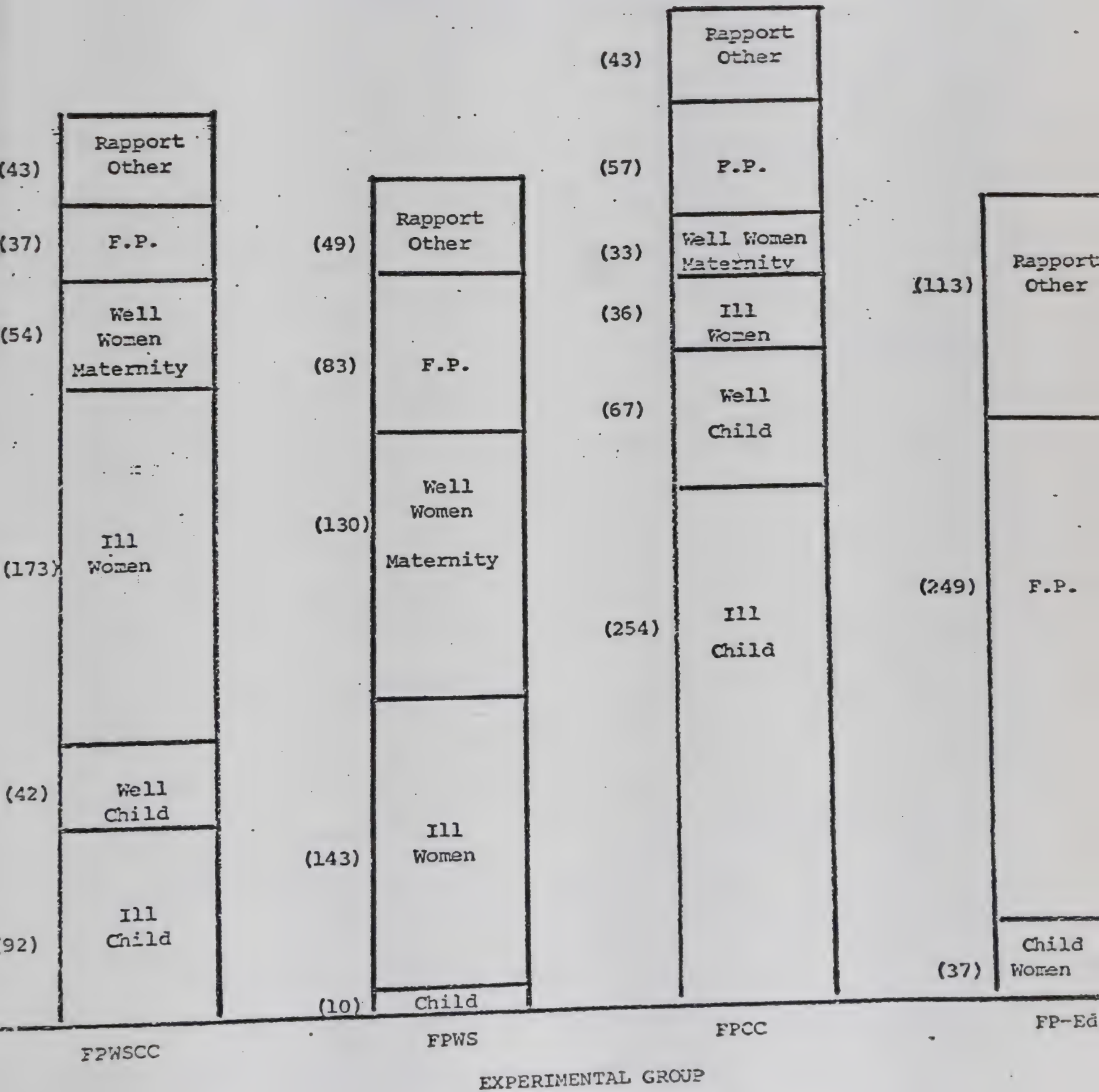
In addition to resident FHW's, other staff were involved in direct services in each village on regularly scheduled visits. The percentage of the total direct service time provided by these staff were 13 percent by male family planning workers (FPW), 4 percent by family health supervisors (FHS) or public health nurses (PHN), and 6 percent by physicians.

A second work sampling carried out in 1973-74 provided additional data on changes in distribution of direct service time, including information about the FPED villages where services started in mid-1972. In villages that received only family planning services (FPED) family planning educators

(FPE) were used instead of FHW's as resident workers (one FPE per 1400 population). Because of a smaller sample size in 1973-74, sufficient data were available only to describe the direct service time of FHW's and FPE's (Figure 6.2). In general, the total direct service time of FHW's followed a pattern of distribution among experimental groups similar to all staff in 1971. The important finding was that FHW inputs in 1973-74 averaged only 70 percent of their input time in 1971. Much of this reduction was in child care services which had been progressively streamlined and simplified in FPWSCC and FPCC. The time spent by FHW's in FPWS villages did not change much. While FHW's in FPCC villages spent almost 500 minutes per week per 1000 population on direct services, those in FPWSCC and FPWS villages spent about 440 minutes and 415 minutes respectively. The total direct service time of FPE's was 400 minutes per week per 1000 population, quite close to the FHW's in the FPWSCC and FPWS experimental groups. In 1973-74, as in 1971, child care, especially for ill children, remained higher in FPCC than in FPWSCC (254 minutes versus 92 minutes) and care of well women including maternity care remained higher in FPWS than in FPWSCC (130 minutes versus 54 minutes). The presence of some activities classified as children's and women's services in FPEd (37 minutes) indicated that a certain amount of time was spent by FPE's discussing these topics during their home visits. No care was provided, but advice was given about what they could do or where they could go for care, usually the nearest government health center. As might be anticipated, FPE's provided much more time specifically for family planning (249 minutes) than any of the FHW's did in their villages (FPWS - 83 minutes; FPCC = 57 minutes; FPWSCC - 37 minutes). Finally, time spent in maintaining friendly relations also was much higher in FPEd villages (113 minutes) than in the other experimental groups (43 to 49 minutes). The equalization of "friendly" time in the health service

Figure 6.2

Average Time Spent Providing Direct Services by Family Health Workers in FPWSCC, FPWS, FPCC Villages, and Family Planning Educators in the FPED Villages
1974 - Minutes per week per 1000 pop.



villages may indicate that rapport had stabilized and FHW's had become accepted in contrast to FPED where services had been active the least time and where there were the least services to offer.

Once again the major findings from the 1973-74 work sampling confirmed that workers providing a limited range of services spent much more time on those services than workers who had to provide similar services in combination with other services. Although this may seem obvious, it was important to identify these differences between experimental groups in quantitative terms in order to determine whether variations in amount of a given service were associated with differences in outcome measures.

Time Per Service Contact

Comparison of service contacts among experimental groups in Chapter 3 showed that the combined services in FPWSCC generated more total contacts than in FPCC, although more time was spent by staff in the latter villages. In addition, FPWSCC had almost twice as many service contacts as FPWS in 1971 and about one-third more in 1973. The differing patterns of time inputs and service contacts can be compared by calculating the average time spent per contact (Table 6.1). In 1971 the time spent per average service contact in FPWSCC was 5.4 minutes. This figure combines all services in the home and clinic into one overall average. Similar estimates were 6.9 minutes per contact in FPWS and 7.6 minutes per contact in FPCC. The greater efficiency of the combined services is indicated by the fact that child care averaged 4.6 minutes per contact in FPWSCC where they were combined with women's services, whereas in FPCC child care services averaged 6.7 minutes per contact. Another factor contributing to the difference between child care services in FPWSCC and FPCC was the greater use of home visiting in FPCC which required more time per contact.

Table 6.1

AVERAGE DIRECT SERVICE TIME IN MINUTES PER RECORDED SERVICE CONTACT
 IN EACH EXPERIMENTAL GROUP--FOR ALL STAFF IN 1971
 AND FAMILY HEALTH WORKERS (FHW) AND FAMILY PLANNING EDUCATORS (FPE)
 IN 1973-1974

<u>Experimental Group</u>	<u>Minutes Per Contact</u>	
	<u>All Staff 1971</u>	<u>FPW/FPE 1973-74</u>
FPWSCC	5.4	4.4
FPWS	6.9	5.7
FPCC	7.6	5.7
FPed	-	14.3

In 1973-74 also the contacts in FPWSCC villages made more efficient use of direct service time (4.4 minutes) than in other villages. In FPEd each contact consumed over 14 minutes, almost three times as much as in the other experimental groups. When time per family planning contact was calculated separately, the rates were found to be about 4 minutes in FPWSCC, 8 minutes in FPWS, 19 minutes in FPCC, and 16 minutes in FPEd. An important reason that probably made the FPCC contacts least efficient was that family planning services were implemented several years after the child care service patterns had been well established, thus requiring major readjustment in the work patterns of FHW's. Just as important, if not more so, was that child care in these villages was supervised by a male pediatrician and family planning by a female physician with the result that FHW's continued to have difficulty integrating the two activities in either their thinking or their work. We also feel from our experience that child care services will always be somewhat more difficult to integrate with family planning services than women's services. However, when family planning was combined with both women's and children's services, FHW's made much more efficient use of their work time.

Cost of Project Services

Detailed accounting of expenditures in the Narangwal population project permitted calculation of costs related to specific functions, activities or services. Work sampling and other data were used to estimate the distribution

salaries and other expenditures among the different experimental groups and types of services. Criteria had been established by the field staff to define the project activities that were classified as research. This research component was excluded in estimating costs so that findings would reflect more accurately the service costs of each component of the service packages.

The cost analysis was made as comprehensive as possible so as to include all identifiable line item components. For example, all donated drugs, food, buildings, and land were given an estimated value based on current market prices. Capital expenditures for buildings, large and small equipment and vehicles were amortized at annual rates of 2, 5, 10 and 10 percent respectively. The various cost components that made up the average annual costs in each of the experimental groups are listed in Table 6.2. The share of the costs related to personnel (the service component of salaries) ranged from 45 percent in the FPWSCC villages to 71 percent in the FPED villages. FPWS and FPCC villages were intermediate with 63 and 51 percent respectively. If the costs of the nutrition supplementation program (food, supplies, salaries, etc.) were subtracted from overall costs in FPWSCC and FPCC the proportion attributable to salaries in the latter two groups was increased to about 54 and 65 percent respectively. On the other hand, the actual rupees spent on the service component of salaries was least in FPED (Rs 6151^{*}), highest in FPCC (Rs 9824) with FPWSCC (Rs 7465) and FPWS (Rs 8491) being in between.

Other major differences included: the large proportion of costs required to pay for food in child care villages (18-20 percent), the greater amount spent on supplies and drugs in the child care villages and the marked variation in referral costs. The referral costs in FPWSCC

* At the midpoint of the project, US \$1 = Rs 7.5.

Table 6.2

DISTRIBUTION OF COSTS BY SPECIFIC CATEGORIES OF EXPENDITURES
IN EACH EXPERIMENTAL GROUP BASED ON AVERAGE ANNUAL COSTS PER 1000 POPULATION*
(Rupees)

Cost Categories	Experimental Group			
	FPWSCC	FPWS	FPCC	FPED
Buildings - 2% **	Rs 217 (1.3)	Rs 230 (1.7)	Rs 193 (1.0)	Rs 209 (2.4)
Maintenance	250 (1.5)	257 (1.9)	270 (1.4)	287 (3.3)
Equipment - 5 or 10% **	300 (1.8)	257 (1.9)	232 (1.2)	148 (1.7)
Supplies	1052 (6.3)	864 (6.4)	1158 (6.0)	513 (5.9)
Vehicles - 10% **	184 (1.1)	216 (1.6)	251 (1.3)	165 (1.9)
Vehicle Running and Maintenance	969 (5.8)	1120 (8.3)	1274 (6.6)	809 (9.3)
Food	2973 (17.8)	-	3860 (20.0)	-
Drugs	2505 (15.0)	1606 (11.9)	1949 (10.1)	366 (4.2)
Referrals	785 (4.7)	459 (3.4)	289 (1.5)	52 (0.6)
Salaries	7465 (44.7)	8491 (62.9)	9824 (50.9)	6151 (70.7)
TOTAL	Rs 16700 (100.0)	Rs 13500 (100.0)	Rs 19300 (100.0)	Rs 8700 (100.0)

* 1970-73 for FPWSCC, FPWS; 1971-73 for FPCC; 1972-73 for FPED.

** Capital expenditures amortized as indicated to provide annual costs.
(Column percentages in parentheses)

Note: US \$1 = Rs 7.5

almost duplicate the combined referral costs of FPWS plus FPCC. For the other recurring cost items that involved consumable material (especially drugs and supplies) the efficiency of combined services in FPWSCC is evident in comparison to the costs of FPWS and FPCC when added together.

The amortized capital costs were only 3.5 to 6.0 percent of the total costs in any of the groups and in terms of actual rupees were almost identical. This graphically illustrates the need to plan for the proportionately greater drain on resources related to recurring costs when developing primary care services and the importance of not becoming over-committed in the area of capital investments. As an example of recurring costs, drugs are of considerable importance in making primary health care programs effective. In the experimental groups with definitive health care services the proportion of expenditures for drugs ranged from 10 to 15 percent. The annual per capita drug cost in the combined service villages (FPWSCC) was about Rs 3.5 (\$0.33). Finally, transportation costs ranged from about 7 to 11 percent of total costs. When compared to the distribution of expenditures in government health centers the major difference is that salaries consume about 75 percent of all funds available in government services reducing proportionately the amount available to spend on drugs, supplies and transportation.

These findings suggest a major need for reversing the present patterns of expenditure. Rather than spending so much on buildings it would be much more practical to provide adequate drugs, supplies and transportation. Finally, in any attempt to plan services, it is important to know the proportion of total costs that are relatively fixed and will produce a constant demand on resources in contrast to those that will vary, depending on use of the services. Costs which we considered

fixed in the short run were primarily capital costs, salaries and part of the building and vehicle maintenance. Fixed costs averaged about 53 percent in FPWSCC, 58 percent in FPCC, 73 percent in FPWS and 83 percent in FPED. These findings would indicate that services in the latter two experimental groups would be much more susceptible to changes in efficiency depending on variations in utilization.

Table 6.3 gives the average annual cost per capita for each type of service in each experimental group. Children's service costs were Rs 4.2 (\$0.56) in FPWSCC villages and Rs 8.0 (\$1.07) in FPCC villages. This difference is another indication of the difference in intensity of surveillance activities in the two experimental groups. Nutritional supplementation, primarily to children from one to three years of age, also was more costly in FPCC than FPWSCC, Rs 6.5 (\$0.87) and Rs 4.5 (\$0.60) per capita respectively. The cost of women's services other than maternity care was Rs 4.5 (\$0.60) in FPWSCC and Rs 6.6 (\$0.88) in FPWS, while maternity care itself was Rs 1.7 (\$0.23) and Rs 3.2 (\$0.43) respectively for these two experimental groups. The limited services to women in FPCC cost much less per capita. For both women's and child care services the FPWSCC costs per capita were consistently lower than in villages receiving either service alone, indicating the greater efficiency of the combined services.

Increased efficiency was also demonstrated for family planning which showed a dramatic progression of costs per capita ranging from Rs 1.8 (\$0.24) for FPWSCC, Rs 3.3 (\$0.44) for FPWS, Rs 5.0 (\$0.67) for FPCC, and Rs 8.1 (\$1.08) for FPED. The total per capita costs per service package obtained by summing the component service costs were Rs 8.7 (\$1.16) for FPED,

Table 6.3

AVERAGE ANNUAL COST PER CAPITA FOR DIFFERENT SERVICES
IN EACH EXPERIMENTAL GROUP (RUPEES)

<u>Service</u>	<u>FPWSCC</u>	<u>FPWS</u>	<u>FPCC</u>	<u>FPED</u>
Child care	4.2	0.4	8.0	-
Nutrition	4.5	-	6.5	-
Women's Services	4.5	6.6	1.0	0.5
Maternity Services	1.7	3.2	0.8	0.1
Family Planning	1.8	3.3	5.0	8.1
<hr/>				
TOTAL	16.7	13.5	21.3	8.7
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Note: \$1 = Rs 7.5

Rs 13.5 (\$1.80) for FPWS, Rs 16.7 (\$2.23) for FPWSCC, and Rs 21.3 (\$2.84) for FPCC. This compares with an estimated per capita expenditure of between Rs 2.0 and Rs 3.0 (\$0.27 and \$0.40) for services provided by government primary health centers in Punjab in 1968-69 (Ref: FAP). It was estimated that if Narangwal staff had received the lower fringe benefits of the Punjab government personnel, if medicine and supplies had been purchased from government stores, and if a major share of the food for nutrition supplementation had been donated by outside sources or collected from the villages, the per capita costs for the FPWSCC services could have been reduced about 50 percent to Rs 8.0 (\$1.07). Although this is still about four times the primary health center costs, it must be balanced against the well-documented findings that these government services actually cover less than one-fourth of the population for either maternal and child health or curative services (Refs: FAP and 1973 Report FAP*). This would make the per capita cost for the population actually served very similar. This conclusion is backed up by the calculations of cost per service contact which follow.

Cost Per Service Contact

The cost per unit of service for children's or women's services at Narangwal (Table 6.4) ranged from Rs. 1.4 to Rs. 2.7 (\$0.19 to \$0.36) compared with a cost of Rs. 1.5 (\$0.20) per patient visit and Rs. 0.8 (\$0.11) per MCH contact in government primary health centers in 1968-1969 (FAP book). There were major differences in the achievements of Narangwal and primary health center services, but the cost per contact for both services were remarkably close.

*Functional Analysis of Punjab Health Services: Report of the Baseline Survey, Director of Health and Family Planning, Punjab, India, GOV Press Chandigarh, 1973.

Table 6.4

AVERAGE COST PER SERVICE CONTACT FOR DIFFERENT SERVICES
IN EACH EXPERIMENTAL GROUP (RUPEES)

<u>Service</u>	<u>FPWSCC</u>	<u>FPWS</u>	<u>FPCC</u>	<u>FPed</u>
Child Care	1.4	-	1.7	-
Nutrition*	0.25	-	0.32	-
Women's Services	2.2	2.7	2.2	-
Maternity Services	5.9	9.8	9.1	-
Family Planning	3.8	5.8	14.4	10.9

*Cost per supplemental feeding

Note: \$1 = Rs. 7.5

Maternity care was relatively expensive, ranging from Rs 5.9 (\$0.79) in FPWSCC, to Rs 9.1 (\$1.21) in FPCC, and Rs 9.8 (\$1.31) in FPWS. Family planning contacts also were expensive with such contacts in FPCC costing Rs 14.4 (\$1.92) per contact, in FPEd Rs 10.9 (\$1.45), in FPWS Rs 5.8 (\$0.77), and in FPWSCC Rs 3.8 (\$0.51). Part of the reason FPCC costs ran higher was because we had essentially duplicated services with poor integration of child care and family planning as mentioned above, largely due to the need to maintain the overlapping nutrition project activities. The costs in FPWSCC villages approached the 1968-1969 cost per family planning contact in primary health centers which was Rs 2.5 (\$0.33). The cost per supplemental feeding was Rs 0.25 (\$0.03) in FPWSCC and Rs 0.32 (\$0.04) in FPCC villages. Just as with costs per capita, FPWSCC consistently had the lowest costs per unit of service again indicating the greater efficiency of combined services.

Expenditures on Non-Project Services

In addition to government (FAP book) and project expenditures on health care services, we found that a large amount of money was still being spent on health care by the villagers themselves. Information on such out-of-pocket expenditures was collected during the sample household survey and combined with project and government expenditure data to estimate total per capita health care expenditures taking place in project villages, including control areas. The findings in Table 6.5 show that provision of project services permitted a reduction in the amount of money spent on

Table 6.5

ESTIMATED ANNUAL PER CAPITA EXPENDITURE ON HEALTH
BY SOURCE OF CARE FOR EACH EXPERIMENTAL GROUP
AND CONTROL VILLAGES (RUPEES)

	FPWSCC	FPWS	FPCC	FPED	CONTROL
Government and Other Services	1.5	2.9	1.5	3.4	6.3
Private Practitioners	13.2	15.7	16.5	22.9	15.9
Subtotal	14.7	18.6	18.0	26.3	22.2
Project Services*	12.2	13.5	12.8	8.7	-
TOTAL	26.9	32.1	30.8	35.0	22.2

* Excluding nutrition supplementation

Note: Cost for government, other services, and private practitioners were estimated using data from the functional analysis project and the 1973-74 sample household survey (Yellow Book)

Note: \$1 = Rs 7.5

health care by the villagers themselves and by the government. Thus, non-project health care expenditures were Rs 14.7 (\$1.96) in FPWSCC, where the most project services were available, compared with Rs 22.2 (\$2.96) in control villages and Rs 26.3 (\$3.51) in FPED villages where no project health care services were available. When the latter two amounts are compared with the total expenditure per capita (both project and non-project) in FPWSCC it is quite clear that introduction of the comprehensive package of women's and children's services (excluding nutrition) in Punjab villages cost only slightly more than the existing pattern of government and private services (Rs 26.9 (\$3.59) versus Rs 22.2 (\$2.96) and Rs 26.3 (\$3.51) per capita per year). In contrast, total expenditures associated with each of the other service packages (FPWS, FPCC, FPED) represent a somewhat more expensive alternative.

Cost/Effectiveness

A series of cost/effectiveness estimates were made using the previously summarized outcome and cost data. In Table 6.6 the specific family planning costs in each experimental group are related to acceptance and couple-years of family planning practice. In addition, total child care costs (health and nutrition) are related to all child deaths averted under three years of age. Actual cost/effectiveness ratios in rupees are shown for the FPWSCC experimental group and then the cost ratios in the other experimental groups are given as multiples of this FPWSCC cost ratio restated as an index of 1.0.

The first row in Table 6.6 shows that the average family planning cost per new acceptor of a modern family planning method during the second year of services in FPWSCC villages was Rs. 92 (\$12.27). In

Table 6.6

COMPARATIVE INDEX OF COST/EFFECTIVENESS RATIOS FOR FAMILY PLANNING
AND CHILD CARE SERVICES
(Ratios in each experimental group related to the ratio in FPWSCC)

	<u>FPWSCC</u>	<u>FPWS</u>	<u>FPCC</u>	<u>FPed</u>
Family Planning Costs Per New Acceptor	1.0 (Rs. 92)	2.0	3.0	3.0
Family Planning Costs Per Couple-Year of Use	1.0 (Rs. 77)	1.7	2.4	2.9
Child Care (Health and Nutrition) Costs Per Child Death Under 3 Averted	1.0 (Rs. 5616)	-	1.1	-

Note: Family planning rates used for these calculations were from the second year of family planning services in each experimental group. Family planning costs were from the same years, but standardized to 1970 prices. Child care costs and deaths averted represent the experience over the four year period 1970-1973.

(\$1 = Rs. 7.5)

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addition, it is seen that similar costs per new acceptor were twice as much in FPWS and three times as much in FPCC and FPED. Next, if one uses the average number of couples who were practicing family planning during the second year of services and assumes that this represents a full year of use by that many couples (couple-year of use), the cost per couple using family planning was Rs. 77 (\$10.27) in FPWSCC. FPWS costs per couple-year of use were 1.7 times as much and FPCC costs were 2.4 times and FPED costs were 2.9 times as much. The above ratios confirm the much greater efficiency of family planning services in the FPWSCC villages. If total health and family planning costs are introduced in cost/effectiveness calculations it obviously changes the picture considerably with FPED becoming the least costly since it had no associated health costs. This latter comparison is only valid if one is not concerned about any other output besides family planning.

The one health outcome measure that was used for cost/effectiveness calculations in Table 6.6 was deaths in children under three years of age. This was considered a proxy for overall impact of child care. Average death rates for this age of children in FPWSCC and FPCC villages were compared with similar rates in the control villages in order to estimate the number of child deaths probably prevented by project services. The cost of child care services, including nutritional supplementation was then related to this outcome measure to give the cost/effectiveness ratios in the final row. The total health cost attributable to each death averted then was Rs. 5616 (\$749) in FPWSCC

villages and a little more in FPCC villages. The cost/effectiveness ratios in these two experimental groups were surprisingly close since services in FPWSCC had little impact on infant (0-1 year) deaths compared with the much greater impact seen in FPCC villages. It would seem that at these levels of services outcome in infant mortality reduction is directly related to the increased input, mainly a difference in the frequency of surveillance.

In contrast to Table 6.6 where all health care costs are attributed to deaths averted, a more careful analysis was then made using data from nutrition study villages that identified the costs of services which most likely produced specific outcomes such as morbidity reduction and improved growth as well as preventing death. It was possible to partial out these costs by allocating a proportion of nutrition and health care costs to prevention of deaths according to the proportion of children dying in control villages (age-specific mortality rates). The balance of health care costs were then attributed to morbidity reduction and the balance of nutrition costs to improvement of physical growth.

Table 6.7 presents these cost/effectiveness estimates for FPCC villages which were also a part of the nutrition study. The costs per death averted are much lower than in Table 6.6 since only a portion of costs were counted as contributing to prevention of deaths. Prevention of perinatal deaths required the least amount of resources (Rs. 74--\$9.87--per death averted), while prevention of infant and 1-3 year deaths used 4 and 10 times this amount. It appears that as age specific mortality rates declined over the first three years of life,

Table 6.7

SPECIFIC COST/EFFECTIVENESS RATIOS COMPARING
DIFFERENT SERVICES FOR CHILDREN IN FPCC VILLAGES

	<u>Rupees</u>
<u>Cost Per Death Averted</u> ¹	
Perinatal	74
Infant	280
1-3 Year Old	761
 <u>Cost Per Day of Illness Averted</u> ²	
Infant	4
1-3 Year Old	3
 <u>Cost Per Additional Cm Growth</u> ³	
At 36 Months	197

¹Using only a proportion of total health and nutrition care costs based on the age specific mortality rate.

²Using total health care costs minus costs counted under mortality

³Using total nutrition costs minus costs counted under mortality

Note: \$1 = Rs. 715

the cost of averting death increased as the child became older. The cost per day of illness averted was fairly similar for infants and 1-3 year old children (Rs. 4 and 3 respectively--\$0.53 and \$0.40). Finally, nutrition costs per additional centimeter of growth achieved by 36 months of age were just under Rs. 200 (\$27) per child.

In summary, these cost/effectiveness findings give information that support the efficiency of the integrated services in FPWSCC. In addition, a breakdown of the child care costs in FPCC permitted calculations that identified the relative cost/effectiveness of different components of these services.

Achievements of Equity in Use of Project Health Services

Prior to the start of project health services, surveys carried out in six of the villages later included in the Population and Nutrition studies had collected data on use of government and private sources of care. These surveys demonstrated a significant direct relationship between income level and use of health services. Lower income individuals used health services less than higher income individuals (FAP p.134). Project services, however, were designed to be available to all individuals in the study villages with special concern for those with the greatest need for services. It was therefore important to ascertain whether we achieved equity in use of project services, overcoming the pre-existing disparities. The following analyses examine the extent of equity achieved in each of the major categories of health services.

1. Use of Curative Services

Table 6.8 presents the coverage of women and children by illness care services throughout the project. These services were mainly patient initiated requiring a visit to the FHW's village clinic. Use of services were categorized into three types: no use at any time during the project, use either early (69-71) or late (72-73) in the project, and use throughout the project. The families were characterized by a number of socioeconomic measures including caste; income; land ownership; possession of radios, sewing machines, or bicycles; and husband's/father's education. It is quite evident that the project services attracted all types of women and children almost equally. Women from the landowning families and those whose husbands were better educated used women's illness services significantly more than other women, otherwise there was no statistically significant differences in use between different socioeconomic groups. However, there was a small but consistent overall trend for women of higher socioeconomic status and children of lower socioeconomic status (except in the case of education) to use services more.

Cross-sectional household surveys measuring utilization of different sources of care mentioned earlier in Chapter 3 also confirmed the equitable distribution of project curative services and the removal of disparities between high and low caste women and children. The data from these surveys showed that 38 percent of illnesses of high caste children were treated by project personnel compared with 39 percent of low caste children (Figure 6.3). Among women the percent

Table 6.8

PERCENT OF FAMILIES WITH VARIOUS SOCIOECONOMIC CHARACTERISTICS USING CURATIVE SERVICES
FOR WOMEN OR CHILDREN DURING THE PROJECT (1969-1973)

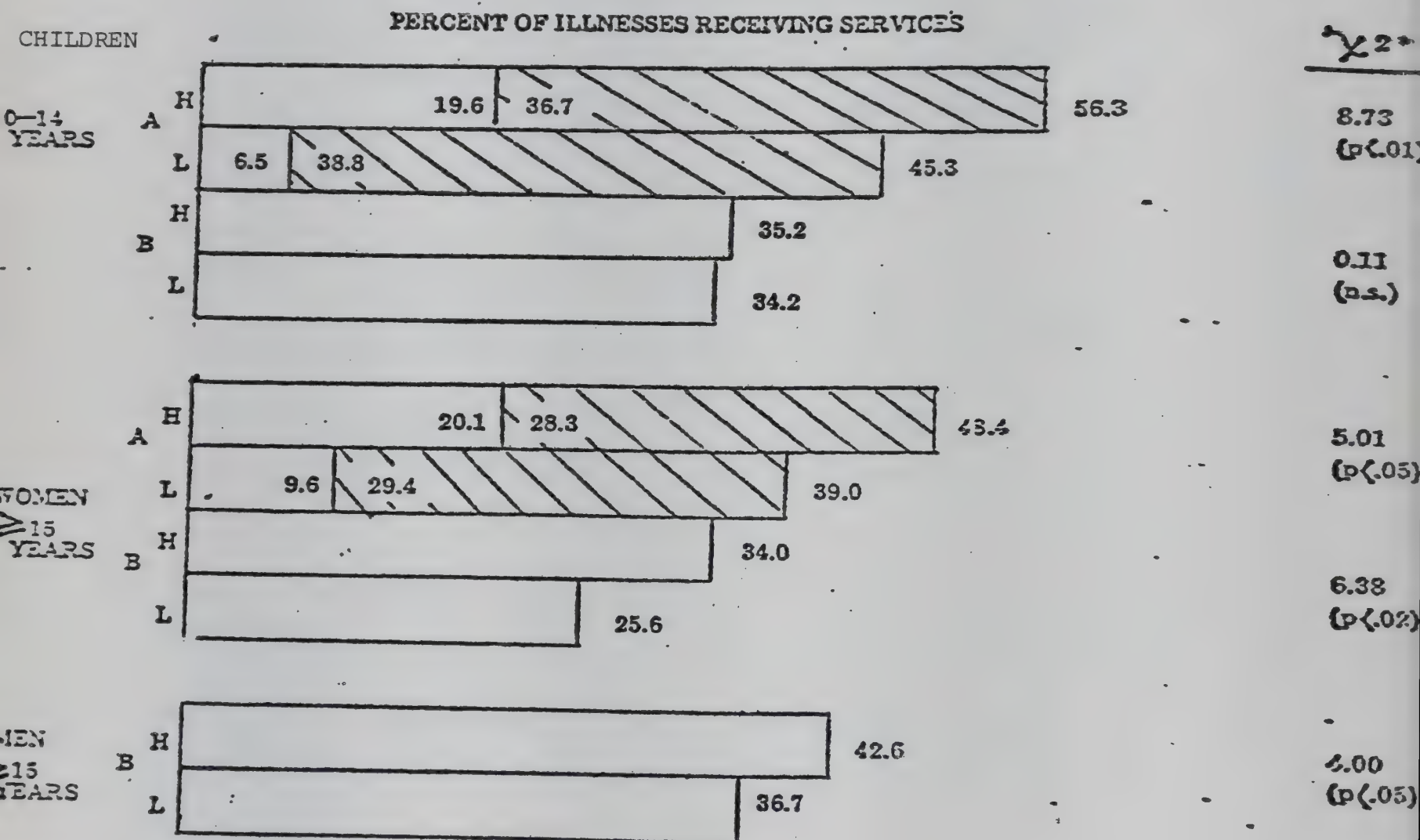
		Women's Services				Children's Services							
		N	% Use	No Use	Some Use	% Use	Full Use	N	% Use	No Use	Some Use	% Use	Full Use
Caste:	Low	477	15.9	15.9	16.2	67.9	67.9	476	12.0	12.0	21.2	66.8	
	High	912	11.6	11.6	17.0	71.4	n.s.	801	13.0	13.0	23.0	64.0	n.s.
Income:	< Rs 1894	450	15.1	15.1	16.2	68.7		357	12.1	12.1	18.2	69.7	
	1894-6500	326	12.0	12.0	18.4	69.6	n.s.	396	12.4	12.4	25.0	62.6	n.s.
	> 6500	390	11.5	11.5	14.6	73.9		341	10.9	10.9	23.7	65.4	
Land:	No	578	15.6	15.6	18.0	66.4		577	11.1	11.1	23.1	65.8	
	Yes	749	10.5	10.5	15.1	74.4	**	642	13.2	13.2	22.0	64.8	n.s.
Possessions:	< 2 Items	570	14.9	14.9	16.3	68.8		476	11.8	11.8	19.7	68.5	
	> 2 Items	592	11.3	11.3	16.4	72.3	n.s.	616	11.7	11.7	24.3	64.0	n.s.
Education:	0-5 Years	979	13.8	13.8	16.6	69.6	*	827	12.8	12.8	21.9	65.3	
	> 6 Years	394	8.9	8.9	20.6	70.5		438	9.8	9.8	23.1	67.1	n.s.

Note: Some Use - Use in 1969-71 or 1972-73
Full Use - Use in 1969-71 and 1972-73

Chi-square tests: n.s. = not significant
* = P < .05
** = P < .01

Figure 6.3

PERCENT OF ILLNESSES RECEIVING SERVICES BY AGE GROUP, CASTE,
AND ACCESS TO NARANGWAL PROJECT HEALTH SERVICES

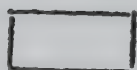


Key: H = High Caste

L = Low Caste

A = Population with access to Project Services

B = Population without access to Project Services



Use of preexisting services of all types



Use of Project Services

* Chi-square on overall utilization rates

of illnesses receiving project services was 28 for high caste and 29 for low caste families. Although project services were equally utilized by different castes, Figure 6.3 also shows that use of outside sources of services by children in non-service villages was very similar by caste group (35 and 34 percent for high and low castes respectively). However, in project villages high caste families continued to use outside sources of services much more than low caste families (20 versus 7 percent) producing a significantly higher overall utilization rate for high caste children (56 percent versus 45 percent for low caste children). Thus, project services in many cases tended to be additional to outside sources of care among high caste children, but they substituted for most outside sources of services among low caste children. This differential pattern of displacement of other sources of care by project services among high caste women and low caste women was similar to that observed in their children. However, in non-service villages high caste women used outside sources of services significantly more than low caste women (34 and 26 percent respectively). The latter finding was also true for men who had access only to outside sources of services in all the project villages. The data, therefore, indicate that the project did deliver its own services equitably but that the demand for continued use of other sources of care varied significantly by socioeconomic level.

2. Use of Other Services

Most services other than curative were project initiated and included preventive and surveillance activities, usually provided in the home. Table 6.9 gives the use of these services in relation to the socioeconomic characteristics of the families. Except for

PERCENT OF FAMILIES WITH VARIOUS SOCIOECONOMIC CHARACTERISTICS USING OTHER SERVICES
FOR WOMEN OR CHILDREN DURING THE PROJECT (1969-1973)

	Women's Services				Children's Services			
	N	% No Use	% Some Use	% Full Use	N	% No Use	% Some Use	% Full Use
Caste:								
Low	477	7.1	16.0	76.9	476	16.0	21.6	62.4
High	912	10.9	18.5	70.6	801	22.6	33.2	44.2
				*				***
Income:								
< Rs 1894	450	11.1	16.2	72.7	357	17.1	25.5	57.4
1894-6500	326	6.2	19.9	73.9	396	19.7	29.0	51.3
				n.s.				**
> 6500	390	10.5	16.4	73.1	341	22.6	34.0	43.4
Land:								
No	578	8.3	18.3	73.4	577	16.8	25.7	57.5
Yes	749	10.2	16.8	73.0	642	22.9	32.7	44.4
				n.s.				***
Possessions:								
< 2 Items	570	8.8	17.0	74.2	476	18.7	25.0	56.3
> 2 Items	592	10.3	17.7	72.0	616	20.5	32.8	46.7
				n.s.				**
Education:								
0-5 years	979	9.0	17.7	73.3	827	21.4	29.3	49.3
> 6 years	394	8.4	14.2	77.4	438	15.5	28.1	56.4
				n.s.				*

Note: Some Use = Use in 1969-71 or 1972-73

Full Use - Use in 1969-71 and 1972-73

Chi-square tests: n.s. = not significant

* = p<.05

** = p<.01

*** = p<.001

differences by caste, the proportion of women using these project initiated services varied slightly but not significantly, by socioeconomic classification. Generally, 10 percent or less never used the services. In addition, unlike curative services where higher socioeconomic groups received more services, a greater proportion of low caste women received services. The reverse was true for educational level since women whose husbands were better educated used other services more than wives of less educated husbands. Use of children's other services must be interpreted with care since the services were primarily designed for children under 3 years. Because the two time intervals in the project were relatively short it was difficult to get a precise fit between observation intervals and periods when children were eligible to receive services; therefore, numbers did not match precisely for children who passed their third birthday during the project or were born in the latter half of the project. It was shown in Chapter 3 that in a given year over 90 percent of children under three years of age received other services. However, since this table includes some families in which the children were over 3, the coverage of all families by these services at any time during the project is about 80 percent. Even with these limitations, it is still apparent that lower socioeconomic families benefitted most from the project's preventive and surveillance services for children. The one exception again, as with curative services, is related to the father's education, where better educated households used these services most. Although some of these differences can be explained by the fact that there were more young children in lower socioeconomic households, the main effect is because these targeted services identified high risk children and concentrated services on them.

Achievement of Equity in Use of Family Planning Services

Pre-program rates of ever-use of modern contraceptives among socioeconomic groups are presented in Table 6.10. Significant differences existed between religion-caste groups, education and occupation groups, age and family size groups. The general pattern was that higher caste, higher education, higher occupation and higher family size groups exhibited greater rates of contraceptive use. The age group 25-34 had the highest rate and the group 25 had the lowest rate.

Contraceptive use rates during the program among socioeconomic groups are also shown in Table 6.10. The differentials among program users were less significant than the pre-program differentials. The only exception was the age of wife where there was a reversal of the differential between the youngest (25) and the oldest (35+). The reversal, which was demographically more advantageous, was so great that the age differential became even more significant than the pre-program differential.

Couples recruited into the program were from three distinct prior-use categories - pre-program users of traditional methods, pre=program users of modern methods and pre-program non-users. It was shown in Chapter 2 that there were no socioeconomic differentials in the recruitment of pre-program users of traditional methods and users of modern methods. More important than elimination of differentials in the recruitment of prior users is the success in narrowing the differentials among new recruits.

Socioeconomic characteristics of couples who for the first time accepted family planning from the program are presented in Table 6.11.

Table 6.10

Comparison of Pre-Program Use (Modern Temporary and Permanent Methods) and Program Use Rates Among Socio-Demographic Groups

	Number of Women	Pre-Program Users (Modern, Temporary, & Permanent Method)	Percent	Program Users	Percent
Religion-Caste:					
Jat-Sikh	1274	262	20.6	584	45.8
Sch-Sikh	895	115	12.9	421	47.0
Others	419	77	18.4	199	47.5
			$\chi^2 = 21.88$		$\chi^2 = 0.49$
			$p = <.001$		n.s.
Education of Husband:					
0	1417	215	15.2	652	46.0
1-5	294	51	17.4	130	44.2
6-10	624	134	21.5	336	53.8
11+	83	36	32.4	50	60.2
			$\chi^2 = 49.0$		$\chi^2 = 17.40$
			$\chi^2_{(3)}$		$\chi^2_{(3)}$
			$p = <.001$		$p = <.001$
Occupation of Husband:					
Farming	993	178	17.9	485	48.8
Labor	632	70	11.0	297	47.0
Service	366	99	27.0	180	49.2
Other	452	93	20.6	217	48.0
			$\chi^2 = 42.85$		$\chi^2 = 0.58$
			$\chi^2_{(3)}$		$\chi^2_{(3)}$
			$p = <.001$		n.s.
Age of Wife:					
<25	537	66	12.3	280	52.1
25-34	865	195	22.6	494	57.1
35+	923	165	17.9	318	34.5
			$\chi^2 = 23.48$		$\chi^2 = 99.5$
			$\chi^2_{(2)}$		$\chi^2_{(2)}$
			$p = <.001$		$p = <.001$
No. of Living Children:					
<3	890	105	11.8	369	41.5
3-5	1047	227	21.6	536	51.2
6+	388	94	24.2	193	49.7
			$\chi^2 = 42.25$		$\chi^2 = 19.50$
			$\chi^2_{(2)}$		$\chi^2_{(2)}$
			$p = <.001$		$p = <.001$

Socio-Demographic Differentials in Recruitment into Program of Previous
Non-Users of Family Planning

Socio-Demographic Groups	No. of Non-Users Before Program	No. of Non-Users Who Became Program Users	Percent Fresh Recruit.
Religion-Caste:			
Jat-Sikh	626	203	32.4
Sch-Sikh	486	189	38.9
Others	191	68	35.6
			$\chi^2_{(2)} = 5.01$
			$p = .084$
Education of Husband:			
0	719	260	35.7
1-5	148	48	32.4
6-10	286	129	45.1
11+	25	10	40.0
			$\chi^2_{(3)} = 9.8$
			$p = .020$
Occupation of Husband:			
Farming	498	191	38.4
Labor	341	132	38.7
Service	165	60	36.4
Other	202	70	34.7
			$\chi^2_{(30)} = 1.2$
			$p = .750$
Age of Wife:			
< 25	314	147	46.8
25-34	373	169	45.3
35+	460	91	19.8
			$\chi^2_{(2)} = 82.9$
			$p = <.001$
Living Children:			
< 3	551	186	33.8
3-5	435	167	38.4
6+	161	54	33.5
			$\chi^2_{(2)} = 2.6$
			$p = .282$

The sociodemographic characteristics of these new recruits were distinctly different from the pre-program users mainly because of considerable success in equalizing their distribution to reflect general community characteristics. This is indicated by comparing pre-program differentials in Table 6.10 with those of new recruits in Table 6.11. Table 6.11 shows that overall differences are no longer significant in marked contrast to the very great differences ($p < .00$) found among pre-program users of modern methods shown in Table 6.10. It seems extremely important that the previous pattern of distribution has been reversed and the lower caste Sch-Sikh group had a recruitment rate considerably greater than in the Jat-Sikh group ($\chi^2_{(1)} = 5.0, p = .025$). Differences by occupation of husband had also been highly significant but now the differences were eliminated. Education of husband maintained the same pattern of distribution as among pre-program users with higher education being associated with higher family planning rates but at considerably lower levels of significance. Again in contrast to the pre-program users who were mainly among older women, the program was able to obtain fresh acceptors at a considerably higher rate from among women belonging to ages under 35 years. Only about 20 percent of women aged 35+ became users of family planning for the first time while about 46 percent of women less than 35 years of age started to practice family planning. Pre-program use exhibited significant relationships with number of living children. By contrast, fresh recruitment ranged from 33.5 to 38.4 percent but these differences were not statistically significant.

A major objective of the program was to make services available to every one and to equalize coverage among different subgroups of the population.

The present results show that significant achievements in equalization of program effects were obtained among different social status groups.

POP MONOGRAPH

CHAPTER 7

DETERMINANTS OF FERTILITY DIFFERENTIALS
BEFORE AND DURING THE PROGRAM

R.S.S. Sarma and Rashid Faruqee

The ultimate goal of integrated health and family planning programs is to influence mortality and fertility. The short period of program activities and fluctuations in fertility rates made it impossible to establish definitively the link between program components and fertility decline. Some insights were obtained, however, about possible interactions of fertility with socioeconomic factors, demographi-biological variables and program interventions.

This chapter includes the fertility profile in Narangwal villages at the beginning of the program and the relationships between fertility levels and socioeconomic characteristics of households. Then we present data on how the fertility profile during the program was affected by contraceptive use interacting with socioeconomic, demographic and biological variables such as parity and interval since last birth. In the next chapter, we describe the apparent fertility impact of Narangwal services, both at the experimental group and individual level.

Profile of Pre-Program Fertility

Data

The present analysis is based on 3280 married women from the

experimental villages. For each woman, a detailed pregnancy history from the time of marriage was obtained using village calendars of national and local events and festivals to verify dates. This cross-sectional survey was conducted in 1968-69 in 22 villages, recording pregnancies of women 15-49 years of age, date of termination of each pregnancy, outcome of pregnancy, sex of child and date of death of child, if dead.

A socioeconomic survey, which was done at the same time, provided information on education, income, occupation, religion-caste, and current age of wife and husband. Since there was very little variation in wife's education (which tended to be zero) and in occupation which was household work, for this analysis we only used the husband's education and occupation.

The cumulative number of children born alive was used as a measure of fertility. Two other demographic variables were included, pregnancy wastage and child loss. These were measured as follows: child loss was measured as the proportion of children born alive who were dead by the time of survey. Pregnancy wastage was measured as the proportion of pregnancies which terminated as fetal deaths.

Table 7.1 presents the aggregate picture of fertility, fetal wastage and child loss among women of the Narangwal study area. Fetal wastage was probably underreported since 5.5 percent of all pregnancies is considerably below the 10-15 percent usually reported. This is indicated also by the probable influence of memory lapse to explain the marked decrease of reported fetal wastage with age, ranging from 13.6 percent for women 15 to 19 years to 3.6 percent in 45-49 year old women. The fact that the child loss ratio did not vary across age groups, ranging

Table 7.1

MEAN NUMBER OF LIVE-BIRTHS PER MARRIED WOMAN, FETAL DEATH
RATE AND CHILD-LOSS RATE BY AGE

Age Group	Married Women No.	Women %	Mean No. of Live-Births	Mean No. of Fetal Deaths	Fetal Death Rate ^{/2}	Mean No. of Live-Born Dead	Child Loss Rate ^{/3}
15-19	197	6.0	0.76	0.12	13.6	0.13	17.1
20-24	636	19.4	1.67	0.16	8.7	0.25	15.0
25-29	667	20.4	3.35	0.26	7.2	0.56	16.7
30-34	598	18.2	4.74	0.25	5.0	0.94	19.8
35-39	502	15.3	5.72	0.26	4.4	1.27	22.2
40-44	428	13.1	6.32	0.30	4.5	1.37	21.7
45-49	250	7.6	6.46	0.24	3.6	1.60	24.8
All ages	3278	^{/1} 100.0	4.11	0.24	5.5	0.84	20.4

^{/1} 2 women were of age < 15.

^{/2} Percent pregnancies terminated as fetal deaths.

^{/3} Percent children born-alive who died by the time of survey.

around 20 percent, may mean that a similar underreporting due to problems of recall were more than compensated for by the rapid decrease that had occurred in child mortality (Table 7.1).

Religion and Caste

The most important social-status variable in rural Punjab is religion and caste. Eighty four percent of the population were classified as high caste landowning Jat-Sikhs and scheduled caste non-Jat Sikhs (Sch-Sikhs) who were among the lowest castes. The remaining 16 percent of the population belonged to non-Jat high caste Sikh groups, Hindus and other religions, and had a diverse range of socioeconomic levels.

Fertility of Sch-Sikhs was higher (4.34 live births) than Jat-Sikhs (3.92 live births) for the entire reproductive age span (Table 7.2). In younger age groups, 15-19 and 20-24, where most marriages took place, the differences in mean live births between Sch-Sikhs and Jat-Sikhs were less marked than at later ages. Presumably then, fertility differences between the two caste groups were not due to differences in age at marriage. The completed fertility of Jat-Sikhs was lower than that of Sch-Sikhs since the mean number of live births per married woman beyond 40 years of age was close to 6 for Jat-Sikhs, as compared with 7 for Sch-Sikhs and for others it was between 6 and 7.

The fertility of others occupied an intermediate position with a mean number of live births of 4.19. This intermediate position was maintained in all the age groups, except that this group had the lowest fertility among the youngest (15-19) and the highest among the oldest (45-49) age group.

The age distribution of women in the three caste groups was different

Table 7.2

MEAN NUMBER OF LIVE-BIRTHS PER MARRIED WOMAN BY AGE
AND RELIGION-CASTE

Age Group	Religion-Caste		Other
	Jat-Sikh	Sch-Sikh	
15-19	0.75	0.84	0.57
20-24	1.44	1.88	1.74
25-29	3.00	4.00	3.18
30-34	4.35	5.43	4.65
35-39	5.21	6.42	6.21
40-44	5.95	6.94	6.44
45-49	5.80	7.16	7.20
All ages	3.92	4.34	4.19
Adjusted for age-differences	3.74	4.65	4.10

so data were adjusted for age-differences, using the age distribution of all women as the standard. The adjusted mean number of live births was 3.74 for Jat-Sikhs, 4.10 for others and 4.65 for Sch-Sikh. The age adjusted fertility rate of Sch-Sikh was 24 percent higher than Jat-Sikhs and 12.3 percent higher for others.

Table 7.3 shows minimal differences between caste groups in fetal wastage. The small number of fetal deaths, especially for older women, presumably was due to memory lapse.

The higher fertility of Sch-Sikh is balanced by higher mortality so that there are equal numbers of surviving children. In each age group (Table 7.4) the mean number of child deaths was higher for Sch-Sikhs than for Jat-Sikhs with others in between. Average loss of offspring per woman for Jat-Sikh, Sch-Sikh and others were 0.66, 1.12 and 0.79. (The age adjusted figures were 0.63, 1.21 and 0.77 for Jat-Sikh, Sch-Sikh and others respectively.) In absolute terms Sch-Sikhs lost twice as many children as Jat-Sikhs.

Education of Husband

Husband's education was the only educational variable for analysis because very few women in reproductive ages had any education. About 59 percent of husbands had no schooling, 11.6 percent and 25.6 percent had 1-5 and 6-10 years of education, and only 3.6 had higher education.

Fertility as indicated by mean number of live births for married women declined with increasing educational level of husbands. Table 7.5 shows that the relationship holds in almost all age groups. Mean number

Table 7.3

FETAL DEATH RATE^{/1} BY AGE AND RELIGION-CASTE

Age Group	Religion-Caste					
	Jat-Sikh		Sch-Sikh		Other	
	Mean No. of Fetal Deaths	Fetal Death Rate	Mean No. of Fetal Deaths	Fetal Death Rate	Mean No. of Fetal Deaths	Fetal Death Rate
15-19	0.05	6.3	0.15	15.2	0.19	25.0
20-24	0.17	10.6	0.17	8.3	0.13	7.0
25-29	0.27	8.3	0.26	6.1	0.26	7.6
30-34	0.23	5.0	0.28	4.9	0.29	5.9
35-39	0.25	4.6	0.24	3.6	0.32	4.9
40-44	0.32	5.1	0.28	3.9	0.28	4.2
45-49	0.22	3.7	0.26	3.5	0.23	3.1
All ages	0.24	5.8	0.24	5.2	0.24	5.4
Adjusted for age-differences	0.23	5.8	0.24	4.9	0.25	5.6

^{/1} Percent pregnancies terminated as fetal deaths.

Table 7. 4

CHILD-LOSS RATE^{/1} BY AGE AND RELIGION-CASTE

Age Group	Religion-Caste					
	Jat-Sikh		Sch-Sikh		Other	
	Mean No. of Live- Born Dead	Child- Loss Rate	Mean No. of Live- Born Dead	Child- Loss Rate	Mean No. of Live- Born Dead	Child- Loss Rate
15-19	0.07	9.3	0.20	23.8	0.02	3.5
20-24	0.16	11.1	0.35	18.6	0.23	13.2
25-29	0.39	13.0	0.89	22.3	0.46	14.5
30-34	0.75	17.2	1.37	25.2	0.70	15.1
35-39	0.93	17.9	1.84	28.7	1.41	22.7
40-44	1.06	17.8	1.98	28.5	1.28	19.9
45-49	1.27	21.9	2.12	29.6	1.68	23.3
All ages	0.66	16.8	1.12	25.8	0.79	18.9
Adjusted for age-differences	0.63	16.8	1.21	26.0	0.77	18.3

^{/1} Percent children born-alive who died by the time of survey.

Table 7.5

MEAN NUMBER OF LIVE-BIRTHS PER MARRIED WOMAN BY AGE
AND EDUCATION OF HUSBAND

Age Group	Education of Husband (Grade Passed)			
	0	1-5	6-10	11+
15-19	0.91	0.50	0.71	0.80
20-24	1.95	1.59	1.51	1.54
25-29	3.69	3.20	3.11	2.74
30-34	4.94	5.03	4.18	4.04
35-39	5.96	5.29	5.54	4.75
40-44	6.54	6.47	5.78	4.57
45-49	6.41	7.70	6.30	-
All ages	4.66	4.09	3.27	2.91
Adjusted for age-differences	4.34	4.15	3.81	3.31 ^{/1}

^{/1} For the purpose of age-adjustment mean number for age group 40-44 was treated as the mean for ages 40 and over.

of live births for women whose husbands had no education was 4.7, with 1-5 years this came down to 4.1, with 6-10 years education to 3.3, and with education beyond 11 years the mean number of live births was 3. The relationship holds when adjustment was made for age difference but the differences were narrowed.

The linkage between education of husband and pregnancy wastage is less clear cut as shown in Table 7.6. For ages beyond 35 years there was a difference in recall as indicated earlier. With higher education, however, there was a much greater ability to remember pregnancy wastage.

Child loss, on the other hand, varied greatly with education (Table 7.7). Mean number of child deaths in families where fathers had no education was slightly more than one, as against 0.85 for 1-5 years of education and 0.52 for 6-10 years, and .26 for 11 years or more education. The striking difference is also shown by percentages of deaths among the four groups, with zero education - 22.1 percent, with 1-5 years - 20.8 percent, with 6-10 years - 15.9 percent, and with more than 11 years of education - 8.9 percent. The child loss rate in the lowest education group is about 2-1/2 times greater than in the highest educational group. Differentials in child loss balanced differences in live births so that mean numbers of surviving children in the different educational levels range from 3.4 to 3.0. Obviously the lower educational groups compensated with higher fertility for the higher mortality rate of their children.

Occupation of Husband

In the study villages, 41.4 percent of husbands were landowning farmers, 25 percent worked as farm laborers, including tending cattle.

Table 7.6

FETAL DEATH RATE^{/1} BY AGE AND EDUCATION OF HUSBAND

Age Group	Education of Husband (Grade Passed)			
	0	1-5	6-10	11+
15-19	12.5	25.4	15.5	20.0
20-24	7.6	11.2	10.1	6.1
25-29	7.1	7.8	7.7	3.5
30-34	5.0	4.9	6.5	1.7
35-39	3.9	4.9	4.2	20.8
40-44	4.3	5.0	3.7	13.6
45-49	3.9	2.5	2.8	-
All ages	5.1	5.8	6.0	7.0
Adjusted for age-differences	5.0	5.7	5.7	11.0 ^{/2}

/1 Percent pregnancies terminated as fetal deaths.

/2 For the purpose of age-adjustment mean number for age group 40-44 was treated as the mean for ages 40 and over.

Table 7.7

CHILD LOSS RATE^{/1} BY AGE AND EDUCATION OF HUSBAND

Age Group	Education of Husband (Grade Passed)			
	0	1-5	6-10	11+
15-19	20.9	14.0	11.3	0.0
20-24	17.4	14.5	11.9	16.2
25-29	17.9	19.4	14.5	9.9
30-34	22.5	18.3	13.2	7.7
35-39	23.7	22.9	18.2	0.0
40-44	22.8	21.3	16.6	12.5
45-49	25.3	24.7	22.9	-
All ages	22.1	20.8	15.9	8.9
Adjusted for age-differences	21.9	20.7	16.3	8.5 ^{/2}

^{/1} Percent children born-alive who died by the time of survey.

^{/2} For the purpose of age-adjustment mean number of live-born dead for age group 40-44 was treated as the mean for ages 40 and over.

Fifteen percent were classified as service since they worked for government or in private business activities. Farmers had high income and moderate education, whereas the service group had a higher level of education but their income was considerably lower than that of farmers. The laborers had low income and education. The fewest live births were reported in service families perhaps indicating the importance of education as compared with income. The highest fertility was among laborers while the farmers and other groups were intermediate (Table 7.8). The age adjusted mean number of live births per married woman was 4.6 among laborers, the other group was 7.6 percent lower, the farming group was 14 percent lower and the service group was 21 percent lower.

The highest fetal wastage was reported in the service group presumably because recall was better in the more educated group. Lower rates were reported by farmers and others, with the lowest figures among laborers again showing the relationship with memory lapse. Child loss was low in service and farming families with about 16 and 19 percent respectively while the highest child loss was among laborers' families. As with husband's education, those groups which experienced higher child mortality had higher fertility, so that surviving numbers of children by occupation groups was approximately the same.

Income

As in other surveys, the income variable was difficult to obtain in all families so that family income was available for only 1,721 women or about half of the families (Table 7.9). Average number of live births for married women decreased with increasing income. In the four income

Table 7.8

MEAN NUMBER OF LIVE-BIRTHS PER MARRIED WOMAN BY AGE
AND OCCUPATION OF HUSBAND

Age Group	Occupation of Husband			
	Farming and Supervision of Land	Labor and Tending Cattle	Service	Other
15-19	0.76	0.82	0.72	0.74
20-24	1.58	1.97	1.44	1.85
25-29	3.35	3.96	2.88	3.40
30-34	4.54	5.47	4.21	4.70
35-39	5.56	6.15	5.36	6.12
40-44	6.24	6.93	5.15	6.73
45-49	6.00	7.26	6.53	6.70
All ages	4.22	4.51	3.20	4.41
Adjusted for age-differences	3.98	4.63	3.66	4.28

Table 7.9

DISTRIBUTION OF WOMEN BY CUMULATIVE NUMBER OF LIVE BIRTHS AND INCOME

Cumulative Number of Live Births	Income - (Rupees)				Total
	< 1000	1000-5999	6000-15999	16000+	
0	16 (6.6)	55 (6.4)	18 (4.5)	13 (5.8)	102 (5.9)
1	26 (10.8)	73 (8.5)	39 (9.8)	28 (12.4)	166 (9.7)
2	24 (10.0)	96 (11.2)	58 (14.6)	32 (14.2)	210 (12.2)
3	23 (9.5)	98 (11.4)	58 (14.6)	44 (19.5)	223 (13.0)
4	28 (11.6)	106 (12.4)	51 (12.8)	29 (12.8)	214 (12.4)
5	25 (10.4)	110 (12.9)	59 (14.8)	21 (9.3)	215 (12.5)
6	29 (12.0)	94 (11.0)	37 (9.3)	14 (6.2)	174 (10.1)
7	28 (11.6)	80 (9.3)	31 (7.8)	20 (8.9)	159 (9.2)
8+	42 (17.4)	144 (16.8)	47 (11.8)	25 (11.1)	258 (15.0)
Total	241 (100.0)	856 (100.0)	398 (100.0)	226 (100.0)	1721 (100.0)
Mean	4.85	4.79	4.36	4.07	4.60

categories the mean numbers of live births were 4.9, 4.8, 4.4 and 4.1 respectively. The differences between the highest income group and the lowest income group was significant but between other groups the differences were not significant. This fits with other data indicating that income was not as important an indicator of fertility as education and other social variables.

Multivariate Analysis of Pre-Program Fertility

A linear regression model was used to study the relative importance of socioeconomic, demographic and attitudinal factors in explaining variation in cumulative number of live births as found at the beginning of the program. This analysis was based on 1,721 women for whom information on all variables selected for multivariate analysis was available with the most limiting variable being income.

Table 7.10 provides regression results on 11 independent variables with the cumulative number of live births as the dependent variable. Since age of the respondent was the most important factor in explaining variation, we subdivided the sample into three broad age categories, less than 25, 25 to 34, and 35 and above. The selected variables in this analysis explained a small amount of the variation in live births - only 9.1 percent for those less than 25 years, 18 percent for the 25-34 group, and 12.5 percent for the 35 and above group. The low R^2 is comparable to other studies of determinants of fertility where physical factors such as duration of marriage (exposure) and biological capacity to reproduce are not considered.

The most important variables are proportion of live born children dead, membership in Jat-Sikh and farming groups; and approval or disapproval

Variable	AGE OF WIFE				35+			
	25		25-34		25		25-34	
	Coefficient	t value	Level of Significance	Coefficient	t value	Level of Significance	Coefficient	t value
								Level of Significance
Religion-Caste:								
Jat-Sikh	-.0062	.03	n.s.	-.8261	3.10	.003	-1.1493	3.34
Sch-Sikh	*	*	*	*	*	*	*	*
Other	.1957	.95	n.s.	.4999	2.08	.040	.5110	1.71
								.001
								*
								.090
Education of Husband	-.1021	1.49	n.s.	-.1409	1.77	.090	.0180	.15
								n.s.
Occupation:								
Farming	-.0705	.37	n.s.	.6974	3.25	.002	.5468	1.87
Labor	.1025	.57	n.s.	-.0084	.05	n.s.	-.1259	.47
Other	*	*	*	*	*	*	*	*
								n.s.
	.0754	.615	n.s.	-.0536	.43	n.s.	.0473	.29
								n.s.
Proportion Children Live-Born Dead	1.0551	3.87	<.001	2.1954	6.09	<.001	2.3841	4.60
								.001
Awareness of Modern Contraception	.3244	1.45	n.s.	.3050	.86	n.s.	.4345	1.05
								n.s.
Attitude: Approve Disapprove Uncertain	.4358	2.58	.010	.6659	3.19	.002	.4372	1.74
	.4801	2.62	.009	.8889	3.92	<.001	.7835	2.85
	*	*	*	*	*	*	*	*
								.090
								.008
								*
Belief about Child Survival/Mortality	.1231	1.53	n.s.	-.0419	.48	n.s.	-.0300	.27
								n.s.
				R ² = .091		R ² = .180		R ² = .125

of family planning. The positive association between fertility and the proportion of live born children dead, can be explained in part by the general finding that mortality increases directly with fertility. The differences also may be due to the possibility that higher mortality also leads to higher fertility, as for example from shortening of lactational amenorrhea. Membership in the Jat-Sikh group was strongly associated with lower fertility. This is significant only at higher age groups and implies that after balancing out child loss this caste group will have a lower fertility rate. The association found earlier with occupation seemed to wash out when analyzed in a multivariate framework perhaps due to multicollinearity.

Both the dichotomous variables relating to attitudes of approval or disapproval towards family planning are significantly associated with fertility with positive signs probably because both groups were compared with the uncertain group who proved consistently to be the most negative group in their attitudes to family planning. The results also indicate that approval and disapproval of family planning were differently associated with the dependent variable. Disapproval led to less contraceptive practice. In the case of approval the statistical association may have reflected a response to actual fertility in that women were more likely to be motivated to practice contraception once they had reached the desired number of children.

It is also interesting that although the proportion of live born children who were dead was a significant variable in almost all age groups, the belief about child survival was not. In other words, once we controlled the

effect of mortality there was little additional effect from perceptions about mortality in explaining variations in cumulative fertility. When other variables were controlled, awareness of modern contraception also added nothing to explaining variation in total number of children ever born. Education of husband which had been a significant correlate of fertility also was not significant in this regression.

Determinants of Fertility Profile During Program

Fertility can be measured by number of live births, pregnancy rate, closed and open birth intervals and change of probability of birth between the beginning and the end of the program. This analysis used a dichotomous variable, namely whether a couple did or did not have a live birth during a calendar year as the dependent variable. A dichotomous variable was also used to indicate whether the couple had used contraception in the previous year or not.

The variables included in the present analysis are as follows:

- | | |
|-------------------------------|--|
| Dependent Variables: | Occurrence or non-occurrence of live births to a couple in a given calendar year. |
| Explanatory Variables: | <p>(a) Use or non-use of family planning in previous calendar year;</p> <p>(b) duration since last live birth up to beginning of given calendar year - duration was measured from marriage for those who had zero live births;</p> |

- (c) live birth-order at the end of previous calendar year (previous parity);
- (d) religion-caste (2 dummy variables designating membership or otherwise in the two groups: Jat-Sikh and Sch-Sikh);
- (e) education of husband (grade passed); and
- (f) occupation of husband (3 dummy variables designating membership or otherwise in the three groups: farming, labor and service).

- The cases included in the present analysis consist of currently married women in the age group 15-44 years, who lived in the experimental villages up to 1973 and on whom pregnancy histories were available. The villages covered are those in which family planning services were available; there were 8 in 1970, 11 in 1971 and 15 by 1972. Our analysis included births in three years, 1971, 1972 and 1973 separately. Corresponding to these births we included practice of contraception in the previous year, 1970, 1971 and 1972. Age groups of women were introduced separately for 1971, 1972 and 1973. The number of women in the analysis for the three years were 2398, 2330 and 2262 respectively.

The focus of this analysis is to trace the effect of contraceptive practice on the probability of births during the program. Since this effect is bound to interact with socioeconomic, demographic and biological variables, we have included those in our analysis. The link between family planning use and fertility is important in understanding the impact

of the program. Difference in births between couples which can be ascribed to use of contraceptives from program services can be defined as the program impact*.

It is important, however, to emphasize the limitations of the main variables chosen to examine the link between family planning and fertility. Placing birth occurrence and contraceptive practice in a calendar year framework is arbitrary and imprecise and presumably diluted the relationship. A birth in a calendar year is preceded by 9 months of pregnancy and susceptibility to pregnancy in the previous calendar year will not be directly influenced by the mere fact that family planning was practiced without knowing whether it was practiced continuously and effectively for the entire period of susceptibility to pregnancy. The contraceptive use variables in this dichotomous form may indicate only a behavioral predisposition to family planning. We have shown elsewhere the relative effectiveness of protection provided by continuous use of specific methods of contraception in the Narangwal project (Ref: Orange Book) and the findings were summarized in Chapter 2.

Table 7.11 presents the impact of family planning on the occurrence of births in three years, 1971, 1972 and 1973. About 17 percent of couples practiced family planning in the first year, about 27 percent of couples practiced in the second year, and about 36 percent in the third year. In general, the occurrence of births among women who practiced family planning was less frequent than among those who did not. The proportions of women who had a birth in the three years were 11.0 percent, 14.0 percent and 14.5 percent among those who practiced family planning in the previous

* In order to separate out the impact of contraceptive use from program services we regarded couples using traditional and indigenous methods during the program period as non-contraceptors.

Table 7.11

PERCENT WOMEN WHO HAD BIRTH IN A CALENDAR YEAR BY
PRACTICE OF CONTRACEPTION THE PRECEDING YEAR

Calendar Year	Users of FP with Birth in Previous Calendar Year			Non-Users of FP in Previous Calendar Year			χ^2	P-Value
	No. of Women	No. of Women with LB in Present Year	Percent	No. of Women	No. of Women with LB in Present Year	Percent		
1971	418	46	11.0	1980	465	23.5	31.3	< .01
1972	621	87	14.0	1709	429	25.1	31.9	< .01
1973	816	118	14.5	1446	306	21.2	14.9	< .01

year as compared with 23.5, 25.1 and 21.2 percent among those who did not. The differences were not uniform and over time the gap seemed to become smaller.

Role of Demographic and Socio-Economic Variables

Age

The effectiveness of contraception in averting births is also influenced by the age of users. Table 7.12 indicates that recruitment to program contraception took place at a much faster rate among women less than 25 years of age than in the two older groups, in spite of the fact that motivation for continuous use would not be as great in the younger age group as in older couples. It is evident from Table 7.13 that among young women (under 25 years) the proportion of women giving birth who had used contraception during the previous year was not significantly lower than among those who did not use contraception. Perhaps young couples used the methods intermittently for spacing. In older couples family planning use was more likely to have been continuous and effective so that more births were averted. It should be noted that even if the birth performance of younger women was not dramatically influenced by contraceptive use it was presumably important in recruiting women who would continue family planning more effectively later.

Previous Parity

The probability of giving birth in a year decreased with increase in parity, both because of family planning practice and impairment of fecundity. Our data show that the proportion of women who gave birth in each of

Table 7.12

PERCENT OF WOMEN WHO HAD BIRTH AND USED FAMILY PLANNING BY AGE
AND CALENDAR YEAR

<u>Calendar Year</u>	<u>No. of Women</u>	< 25		<u>No. of Women</u>	25-34		<u>No. of Women</u>	35-44	
		<u>No. of FP Users in Previous Years</u>	<u>Percent</u>		<u>No. of FP Users in Previous Years</u>	<u>Percent</u>		<u>No. of FP Users in Previous Years</u>	<u>Percent</u>
1971	662	51	7.7	972	185	19.1	764	182	23.9
1972	534	100	18.8	1015	290	28.5	781	231	29.6
1973	430	137	31.9	1013	382	37.7	819	297	36.3

Table 7.13

PERCENT WOMEN WHO HAD BIRTH IN A CALENDAR YEAR BY AGE AND PRACTICE OF
FAMILY PLANNING IN PREVIOUS YEAR, 1971-1973

Calendar Year	Age Group	Use of FP in Previous Year and Live Births in Present Year			Non-Use of FP in Previous Year and Live Birth in Present Year			X ²	p-value
		No. of FP Users	No. of LB	Percent	No. of Non- FP Users	No. of LB	Percent		
1971	< 25	51	20	39.2	611	212	34.7	0.25	.64
	25-34	185	21	11.4	787	204	25.9	17.06	<.01
	35+	182	5	2.8	582	49	8.4	5.95	.02
1972	< 25	100	35	35.0	434	157	36.2	0.01	.75
	25-34	290	41	14.1	725	222	30.6	28.46	<.01
	35+	231	11	4.8	550	50	9.1	3.65	.05
1973	< 25	137	48	35.0	293	117	39.9	0.75	.41
	25-34	382	66	17.3	631	148	23.5	5.08	.02
	35+	297	4	1.4	522	41	7.9	14.21	<.01

the reference years, that is 1971, 1972 and 1973, decreased as parity increased and that the proportion of women who practiced contraception during the previous year also increased with parity. Table 7.14 indicates that at each parity, except the first group (that is zero to one parity) fertility was lower among contraceptors than non-contraceptors. There was also a decline in fertility with increase in parity both among contraceptors and non-contraceptors (Figure 7.1). The progressive reduction in the rate of decline in fertility by parity among non-contraceptors confirms the effect of other factors on fertility decline. These factors include non-program and traditional methods of family planning, separation of marriage partners and secondary sterility. This can be quantified roughly by determining the proportion of women with open birth intervals greater than five years as presented in Table 7.15. This proportion increased rapidly up to third parity and then more slowly. This is perhaps due to the use of non-program methods of contraception and other measures.

Duration of Interval Since Last Birth

Another factor influencing the occurrence of a birth in a given year is length of time since the last birth. It may be noted that this is an open interval measured until the beginning of the calendar year under consideration. When there was no earlier birth, duration was measured from the time of marriage. Decreased fertility during lactation is followed by a higher probability of birth after lactational amenorrhea. Subsequently increased duration is associated with lower probability of birth, since longer durations result from secondary sterility or practice of family planning. When contraception is practiced for the purpose of spacing

Table 7.14

PERCENT WOMEN WHO HAD BIRTH IN A CALENDAR YEAR BY PREVIOUS
PARITY AND PRACTICE OF FAMILY PLANNING IN PREVIOUS YEAR

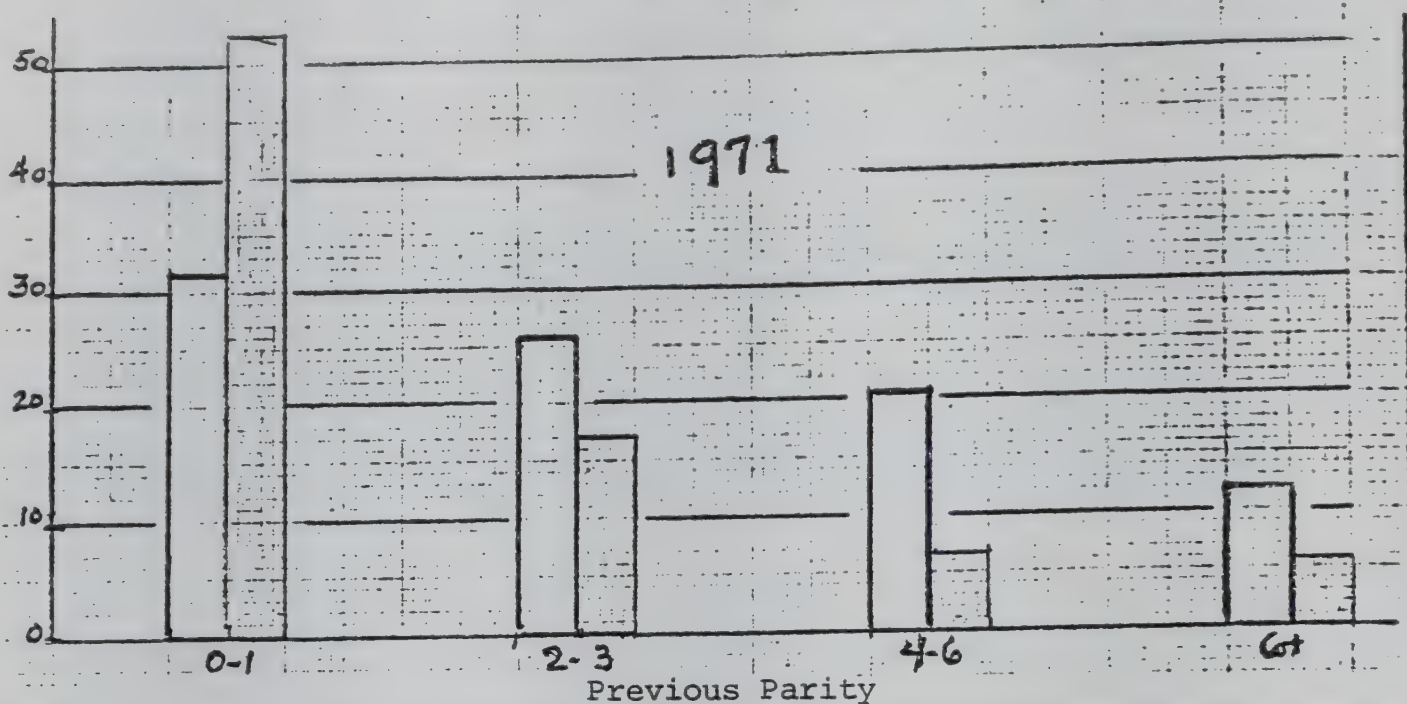
Previous Parity	Percent Women Who Had Birth in Calendar Year					
	1971		1972		1973	
	Non-Users of FP	Users of FP	Non-Users of FP	Users of FP	Non-Users of FP	Users of FP
0-1	31.6 (608)	52.6 (19)	34.0 (462)	45.9 (61)	33.0 (336)	36.5 (74)
2-3	25.8 (507)	17.1 (105)	28.0 (471)	15.9 (183)	23.7 (427)	20.9 (263)
4-5	20.9 (436)	6.5 (124)	23.1 (386)	11.7 (180)	15.4 (337)	9.9 (243)
6+	11.9 (429)	5.9 (170)	13.1 (390)	4.6 (197)	12.1 (346)	5.1 (236)

Note: Values in parentheses are numbers of women on which percentages were based.

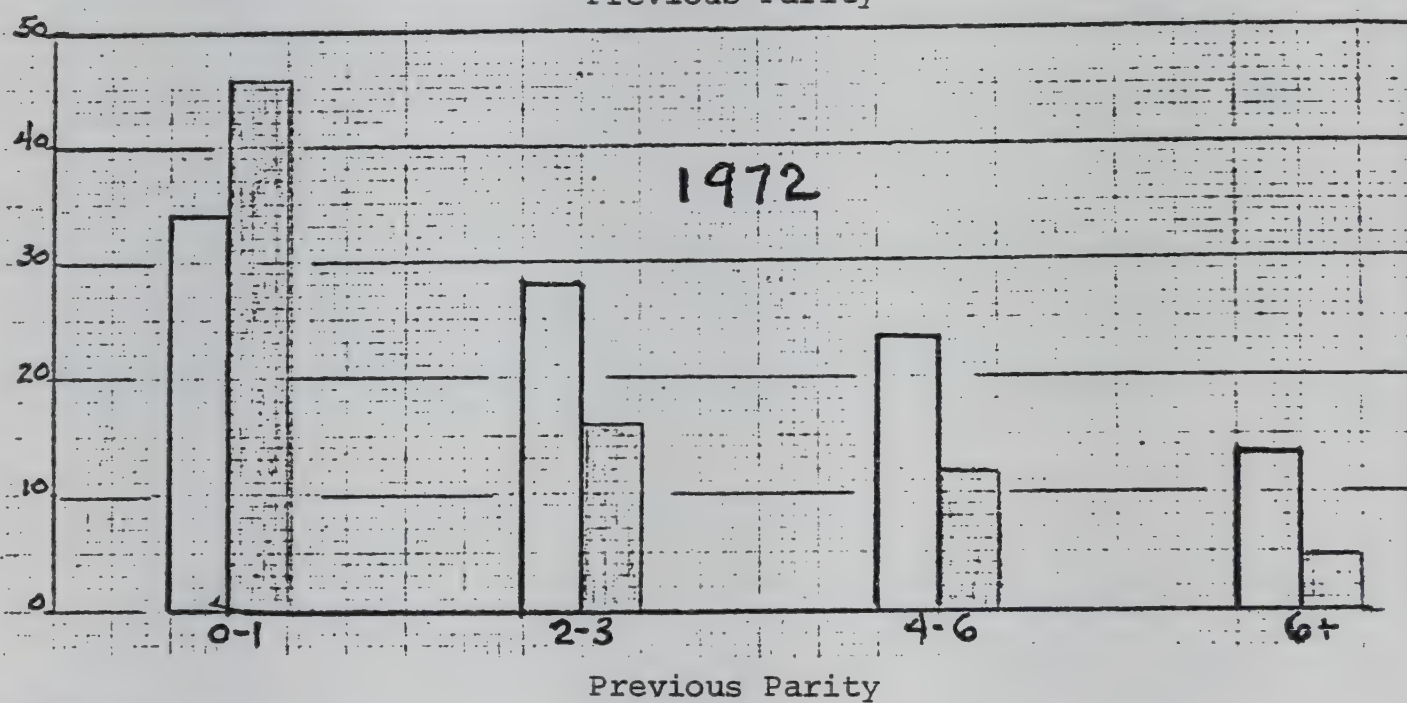
Figure 7.1

Percent Women Who Had Birth in a Calendar Year by Previous Parity and Practice of Family Planning in Previous Year

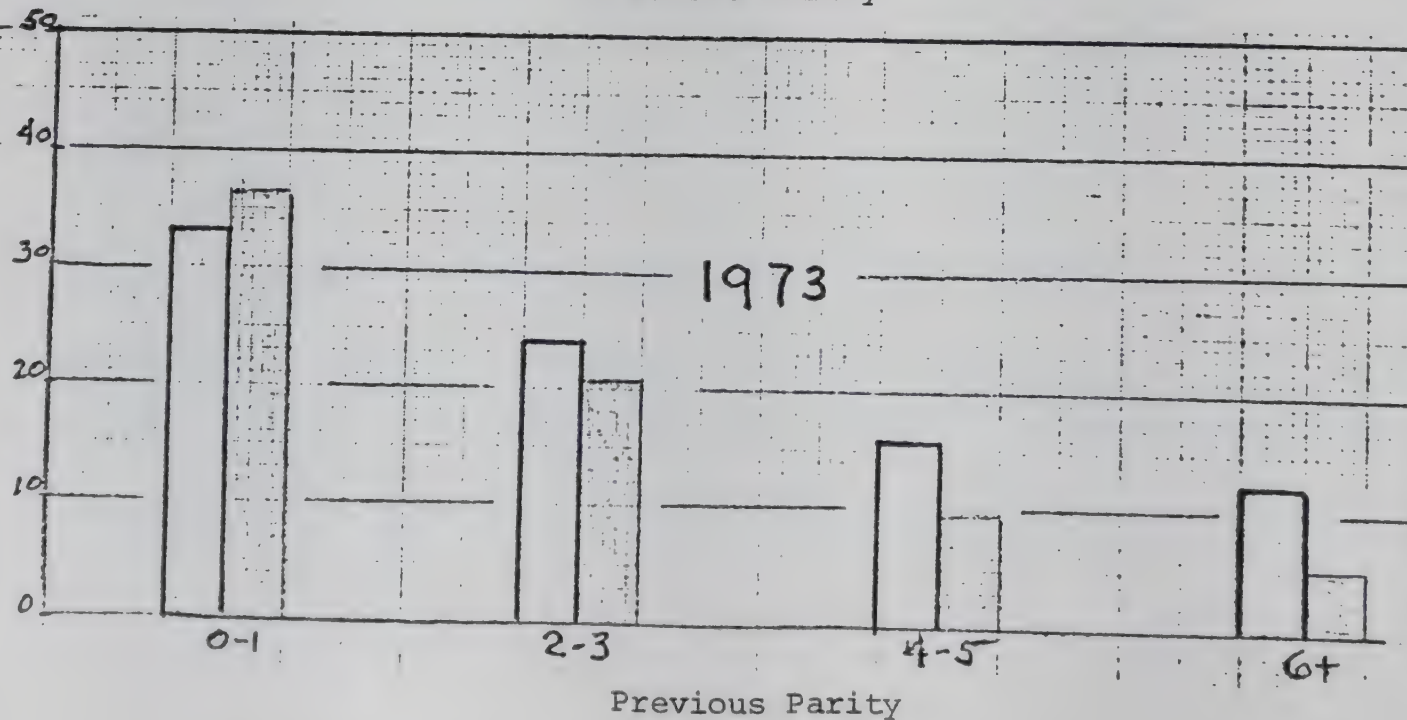
Percent with birth in 1971



Percent with birth in 1972



Percent with birth in 1973



FP Users FP Non-Users

Table 7.15

PERCENT WOMEN WITH OPEN BIRTH INTERVAL
GREATER THAN FIVE YEARS BY PARITY

<u>Parity</u>	<u>Open Birth Interval Measured up to Beginning of Calendar Year</u>		
	<u>1971</u>	<u>1972</u>	<u>1973</u>
1	11.6 (303)	9.6 (301)	12.6 (262)
2	15.3 (314)	16.1 (322)	16.7 (341)
3	22.1 (298)	23.2 (332)	25.2 (349)
4	27.4 (307)	28.9 (294)	30.6 (284)
5	32.0 (253)	33.1 (272)	31.8 (296)
6	30.7 (202)	34.6 (208)	34.1 (205)
7	27.4 (146)	30.4 (138)	30.2 (139)
8+	26.3 (351)	26.6 (341)	29.0 (238)

Note: Total number of women at each parity are in parentheses and those who had open birth interval greater than 5 years are presented as percentages.

open intervals longer than desired spacing would be associated with higher probability of birth. Duration since last birth presumably starts with a positive association with probability of birth but the association would turn negative when duration is greater than desired spacing.

Table 7.16 shows that the proportion of women who gave birth in a calendar year increased up to 24 months duration of the open interval and then started declining. Of particular interest are the decreasing percentages of women who had a birth and the increasing percentages of women practicing family planning sequentially year by year. The proportion of women who experienced a birth was considerably lower among contraceptive users than nonusers at all durations. The differences in birth performance were however greater after duration of about 18 months than before. This is probably because up to that time some women were in postpartum amenorrhea and hence contraception had very little effect on their birth performance. Only beyond the post partum amenorrhea period could the benefit of contraception be fully demonstrated.

An open interval of zero to 6 months would normally be covered by post partum amenorrhea except, of course, with zero parity or those women who did not lactate because their last baby died soon after birth. For children who died the lactation effect would depend on duration of the period up to death. We presumed that the family planning practice rate among women of zero parity would be almost nil and contraceptive practice soon after the death of a baby would also be negligible. We found, however, that the rate of practice of family planning was surprisingly high during the zero-six months open interval, 10 percent in 1971,

22.1 percent in 1972 and 28 percent in 1973 (Table 7.16). The demographic impact of contraception during amenorrhea would presumably be lower than afterwards.

In general, these results of birth interval analysis confirm the impression that the impact of family planning was mostly in terminating childbearing rather than spacing. Among family planning users the birth interval curve was highest at 19-24 months in 1971 but declined to 13-18 months in subsequent years. Among non-users the interval remained at 19-24 months throughout the project.

Social Status Variables

The impact of family planning practice would not be expected to be the same in all socioeconomic groups. Table 7.17 shows proportions of users and non-users of contraceptives by caste groups who had a birth a year later. Among the religion-caste categories the greatest impact was in the highest caste group of Jat-Sikhs, where birth performance was significantly lower among contraceptors than noncontraceptors. This was true in all three years of the study. Sch-Sikhs also exhibited a significant impact of family planning on birth performance except, surprisingly, in 1973 when program effects should have been greatest. There were, however, no significant differences in birth performance among contraceptors in the others group presumably because the fertility was already low in those who were not using contraception from program sources.

The role of husbands education in determining the effect of contraception on birth performance was compared in those with less than sixth

Table 7.17

PERCENT WOMEN WHO HAD BIRTH, BY PRACTICE OF FAMILY PLANNING IN
PRECEDING YEAR AND RELIGION-CASTE

Religion- Caste	Calendar Year	Percent Women Who Had Birth		χ^2	P-Value
		Non-Users of Family Planning	Users of Family Planning		
Jat-Sikh	1971	19.4 (940)	7.1 (226)	18.8	< .005
	1972	25.7 (829)	10.9 (303)	58.3	< .005
	1973	16.9 (715)	7.0 (384)	20.1	< .005
Sch-Sikh	1971	29.3 (728)	16.7 (132)	8.3	< .005
	1972	26.7 (634)	16.2 (204)	8.7	< .005
	1973	28.0 (526)	22.7 (286)	2.4	.133
Others	1971	23.0 (304)	13.3 (60)	2.3	.144
	1972	19.8 (238)	18.4 (114)	0.0	.950
	1973	19.3 (197)	17.8 (146)	0.0	.950

grade education and more than sixth grade education. Table 7.18 shows that births among users of family planning were significantly lower than among nonusers in both education groups. During 1971 and 1972 the impact of family planning on birth occurrence was actually greater among the less educated than the more educated group. It appears, however, that among the less educated group the differences in birth performance between users and nonusers of family planning became less pronounced, from one year to the next, perhaps because of inclusion of more young women in later years.

The impact of family planning on birth performance by occupation groups is shown in Table 7.19 with the impact being greatest among farmers. The service group showed the next most significant effect of family planning use but in the remaining two groups the effect of family planning on birth occurrence was significant only in one of the three years under study.

Multivariate Analysis

A multivariate analysis was done using a dichotomous variable indicating whether or not the woman had a birth during a calendar year as the dependent variable. This was regressed on several explanatory variables, namely previous parity, duration since live birth, contraceptive use (dichotomous) in previous year, religion-caste, education of husband, occupation of husband. Separate regressions were done for the three years 1971, 1972 and 1973. The results are summarized in Table 7.20.

Previous parity was the most significant variable in explaining variation in probability of birth in a calendar year. Also highly significant was the finding that the longer the duration of the open interval since last birth, the lower the probability of birth during the calendar year.

Table 7.18

PERCENT WOMEN WHO HAD BIRTH, BY PRACTICE OF FAMILY PLANNING IN
PRECEDING YEAR AND EDUCATION OF HUSBAND

Education of Husband (Grade Passed)	Calendar Year	Percent Women Who Had Birth			
		Non-Users of Family Planning	Users of Family Planning	X ²	P-Value
0-5	1971	22.9 (1274)	8.6 (292)	29.5	< .005
	1972	24.1 (1100)	12.9 (412)	22.1	< .005
	1973	20.1 (949)	15.2 (513)	5.1	.024
6+	1971	25.8 (629)	14.2 (113)	6.4	.012
	1972	30.6 (545)	18.0 (183)	10.3	< .005
	1973	24.7 (421)	13.5 (290)	12.9	< .005

Note 1: Values in parentheses are the numbers of women on which percentages were based.

Note 2: Non-users and users of FP in above Table add only to 1903 and 405 in 1971, 1645 and 595 in 1972, 1370 and 803 in 1973. Education was not known among non-users and users for 77 and 13 in 1971, 64 and 26 in 1972, 76 and 13 in 1973.

Table 7.19

PERCENT WOMEN WHO HAD LIVE BIRTH, BY PRACTICE OF FAMILY PLANNING IN
PRECEDING YEAR AND OCCUPATION OF HUSBAND

Occupation of Husband	Calendar Year	Percent Women Who Had Live Birth			
		Non-Users of Family Planning	Users of Family Planning	X ²	P-Value
Farming	1971	20.2 (738)	5.9 (186)	20.2	< .00
	1972	27.2 (648)	12.6 (246)	20.4	< .00
	1973	19.2 (553)	8.3 (314)	17.6	< .00
Labor & Tending Cattle	1971	27.6 (497)	20.8 (96)	1.5	.23
	1972	25.7 (424)	13.5 (148)	8.7	< .00
	1973	25.4 (358)	23.6 (191)	0.1	.75
Service	1971	24.4 (352)	9.4 (64)	6.3	.01
	1972	26.0 (308)	17.8 (101)	2.3	.14
	1973	24.9 (257)	12.4 (145)	8.2	< .00
Other	1971	25.4 (339)	9.1 (66)	7.4	.00
	1972	21.1 (275)	15.0 (120)	1.6	.22
	1973	17.7 (226)	17.6 (159)	0.0	.95

Note 1: Values in parentheses are the number of women on which percentages were based.

Note 2: Non-users and users of FP in above Table add only to 1926 and 412 in 1971, 1655 and 615 in 1972, 1394 and 809 in 1973. Occupation was not known among non-users and users for 54 and 6 in 1971, 54 and 6 in 1972, 52 and 7 in 1973.

Table 7.20

RELATION OF PROBABILITY OF BIRTH IN A CALENDAR YEAR
TO SELECTED VARIABLES - REGRESSION COEFFICIENTS AND THEIR LEVELS OF SIGNIFICANCE

Variable	1971			1972			1973			
	Regression Coefficient	t value	Level of Significance	Regression Coefficient	t value	Level of Significance	Regression Coefficient	t value	Level of Significance	
Previous Parity	-.0506	14.3	<.010	-.0480	12.9	<.010	-.0467	13.2	<.010	
Duration Since Last Live Birth	-.0009	4.7	<.010	-.0015	7.3	<.010	-.0011	5.5	<.010	
FP in Previous Year	-.0889	4.0	<.010	-.1067	5.5	<.010	-.0667	3.9	<.010	
Religion-Caste:										
Jat-Sikh	-.0515	1.9	.050	-.0197	0.6	n.s.	-.0929	3.2	<.010	
Sch-Sikh	.0627	2.2	.030	.0377	1.3	n.s.	.0691	2.6	.010	
Other	*	*	*	*	*	*	*	*	*	
Education of Husband	-.0021	0.0	n.s.	-.0016	0.6	n.s.	-.0012	0.6	n.s.	
Occupation of Husband:										
Farming	-.0011	0.0	n.s.	.0529	1.6	.100	.0468	1.6	.100	
Labor	.0069	0.3	n.s.	.0108	0.3	n.s.	.0252	0.9	n.s.	
Service	-.0392	1.5	n.s.	.0038	0.0	n.s.	.0030	0.1	n.s.	
Other	*	*	*	*	*	*	*	*	*	
			R ² = .136				R ² = .130			
								R ² = .132		

* Suppressed category.

n.s. Not significant ($p > .10$).

For every additional 10 months of duration, the probability of birth was reduced by approximately 1 percent. Since duration from the last birth includes lactational amenorrhea, it may be that the effect of contraception on birth performance is partly captured by the duration variable.

Contraception in the previous year had a significant effect on birth performance reducing it by nearly 7 to 11 percent depending on the calendar year. This is a minimal estimate of impact of contraception for the following reasons: anyone who practiced contraception in the previous year counted as contraceptive irrespective of length of use and this would dilute observed impact. Persons who used contraception other than what was provided by the program were regarded as nonusers (this applied both to traditional and modern methods). The methods used varied greatly in their effectiveness. The effect of sterilization is especially reflected in the duration variable. Even among those using family planning methods provided by the program, only the previous year's contraceptors were considered in the present model. Birth performance in a year would also be influenced by contraception during the same year. In 1973 when the delivery of family planning services reached a peak, the proportion of women who had a birth was only 19 percent and the proportion of couples who used contraception in the previous year was nearly 29 percent. If nobody had used family planning during the previous year the proportion of women giving birth in 1973 would have been higher by nearly 12 percent (marital fertility rate would have been 224 instead of 198 per 1000 women).

Significant relationships were found between the parity and a birth in a given year and religion caste except for 1972. Membership in the Jat-Sikh group was strongly associated with lower probability of birth. The probability of birth in a given year did not, however, seem to be associated with education of the husband.

POP MONOGRAPH

CHAPTER 8

IMPACT OF SERVICES ON FERTILITY

Rashid Faruquee and R.S.S. Sarma

When the Narangwal study was designed, it was assumed that integrated services would produce both an increase in contraceptive practice and also a decline in fertility. Because the program did not continue long enough to show a statistically significant differential fertility impact in the various experimental groups, we have relied mostly on contraceptive practice to measure the effect of services. In Chapter 7 we showed how contraceptive use, interacting with other variables, affected births among women in the study villages.

In this chapter we present fertility outcome data from Narangwal villages at two levels: (a) by tracing what happened to fertility by experimental groups and (b) by examining individual fertility changes which can be ascribed to the use of services.

Analysis by Experimental Group

Analysis of fertility in the experimental groups has been useful mainly to confirm effects observed in family planning practice. Limitations in financial and logistic resources made it impossible to include large enough population units in each experimental group to obtain definitive fertility information in the short time we had for field observation. The fallibility of annual fertility measurements which

fluctuate regardless of population size means that we should have observed fertility trends over a few more years. In our small population units we expected to have a standard error permitting fluctuation of ± 2 points in annual birth rates.

We have computed annual age specific fertility rates for the total Narangwal population. For the experimental groups we calculated birth rates and annual marital fertility rates for the years 1970, 1971, 1972 and 1973. We were surprised by the amount of fertility decline that occurred in comparison to the general Punjab rate of fertility decline which was 5 percent per year in integrated villages compared with 1 percent per year in the Punjab generally. Our lack of complete conviction in reporting these results is due to fluctuation in annual rates and because control rates also fell by 3 percent per year.

Fertility of Total Study Population

Computed age specific birth rates for the total Narangwal population for 1970-73 are presented in Table 8.1. Peak fertility is mostly in the age group 25-29. The youngest age group, 15-19, continued to have a high level of fertility throughout the four years. The overall decline in fertility was small and occurred mainly in age specific fertility rates for women 30 years and older. Our other data showed that these were the women who used contraceptives most frequently. In effect, this indicates that Narangwal women used contraceptives more for limiting births than for spacing.

Table 8.1

Annual Age-Specific Marital Fertility Rates, Narangwal Study Villages (26)
1969 to 1973

Ages of Married Women	1970 22 villages	1971 22 villages	1972 26 villages	1973 26 villages
15-19	144.3 (693)	173.3 (675)	125.2 (687)	120.9 (604)
20-24	295.1 (1142)	281.3 (1191)	243.3 (1459)	240.6 (1563)
25-29	287.6 (848)	292.8 (847)	310.6 (1027)	301.5 (1048)
30-34	225.8 (660)	219.4 (661)	185.1 (794)	188.8 (800)
35-39	89.8 (590)	110.0 (591)	97.8 (726)	103.4 (725)
40-44	51.5 (505)	27.7 (505)	32.4 (649)	23.0 (653)
45-49	5.3 (375)	18.7 (374)	6.4 (467)	6.4 (467)
Marital Fertility Rate 15-49	189.0 (4803)	192.2 (4844)	172.5 (5809)	172.2 (5860)

Annual number of livebirths per 1000 married women (Numerators based upon pregnancy histories as well as data from all other study sources including service records. Denominators taken from study census rounds 1 (1968), 2 (1971), 3 (1973) with linear extrapolations for 1969, 1970 and 1972.

Fertility Data by Experimental Groups

Annual marital fertility rates by experimental group for 1970-73 are presented in Table 8.2. Considerable fluctuation in fertility rates from year to year is apparent, partly because the sample size was small when disaggregated by experimental groups.

The overall pattern of fertility indicates an acceleration of the secular decline in Punjabi fertility which was calculated to be about 1 percent per year during the previous decade. The marital fertility rate for all groups combined dropped from 189 in 1970 to 172 in 1973, or a decline of 9 percent in four years.

Among experimental groups the largest decline occurred in FPWS group (21 percent), followed by the FPWSCC group (15 percent). The FPEd group experienced a 7 percent drop, while the control group had a 12 percent decline. The FPCC group registered a rise of 2 percent. Thus, some of the groups receiving integrated services (FPWS and FPWSCC) experienced a substantial decline, which is significantly greater than the control group. This was not true of FPCC which showed marked fluctuations. The crude birth rates (Table 8.3) reflect the same patterns.

The fertility data do not permit firm inferences to be drawn about trends in annual fertility rate disaggregated by experimental groups and about the impact of services on these rates. First, the time period was too short to observe a secular trend or to calculate three year moving averages to correct fluctuations. Second, the actual numbers of births in a year, on which the fertility rates were based, were few and fluctuations in numbers were accentuated because, as a result of long birth intervals, they represented births to different groups of women.

Table 8.2
Annual Marital Fertility Rates by Experimental Groups and Villages
1970-1973

EXPERIMENTAL GROUP	1970	1971	1972	1973
FPWSCC	196.5 (1043)	184.4 (1052)	182.4 (1069)	166.7 (1086)
FPWS	208.0 (827)	185.2 (826)	202.8 (848)	163.4 (869)
FPCC	191.8 (803)	205.2 (809)	170.9 (819)	195.7 (828)
FPed			182.1 (895)	170.8 (878)
CONT-P	184.6 (899)	189.4 (908)	161.0 (913)	162.5 (917)
OTHER-NUT	171.4 (1231)	197.0 (1249)	146.2 (1265)	175.5 (1282)
TOTAL	189.0 (4803)	192.2 (4844)	172.5 (5809)	172.2 (5860)

Annual number of livebirths(from all sources) per 1000 married women (from census 3 rounds, with linear extrapolation between rounds)

Table 8.3
Crude Birth Rates by Experimental Group
1970-73

EXPERIMENTAL GROUP	1970	1971	1972	1973
FPWSCC	36.7	34.4	32.8	29.0
FPWS	38.3	33.2	36.1	28.8
FPCC	34.2	36.0	29.6	33.3
FPed			30.0	27.0
CONT-P	33.9	34.1	28.3	27.9
TOTAL	34.1	34.1	29.7	28.9

Average number of livebirths per 1000 population (Numerators from all study sources pooled. Denominators from Census Rounds 1 (1968), 2 (1971 except FPed in 1972), 2 (1973) with linear extrapolations for years 1970 and 1972).

Third, as noted earlier, there was variation in the quality of birth data gathered in the various experimental groups with villages that had the most extensive services having the least under-reporting. There were six different sources of birth data but in general we started with the two pregnancy history surveys and then used other sources to update and correct birth reporting. A birth missed by the first or second pregnancy history was picked up by special vital statistics investigators or through service records, was added to the pregnancy history of the mother. Service records varied somewhat from one experimental group to another because of differential patterns of coverage and varying intensity of services.

We analyzed detailed data on the differences in family planning use and birth performance relationships in the experimental groups. Table 8.4 presents the results. Family planning use produced its greatest impact in FPWS with highly significant differences in all three years. Significant reductions in birth performance also occurred in FPWSCC though the impact was less than FPWS. These results establish the time between the use of services and reductions of fertility through contraceptive use. Table 8.2 showed that the highest fertility decline took place in FPWS (23 percent) followed by FPWSCC (21 percent). These results indicate that such declines were achieved by contraceptive use from program sources.

In FPCC and FPEd significant reductions in birth performance were not as evident partly because of smaller numbers of contraceptive users, but also perhaps because there were women in these villages who were practicing family planning but using other sources such as the government primary

Table 8.4

PERCENT WOMEN WHO HAD BIRTH, BY PRACTICE OF FAMILY PLANNING IN
PRECEDING YEAR AND EXPERIMENTAL GROUP

EXPERI- MENTAL GROUP	Calendar Year	Percent Women Who Had Live Birth			
		Non-Users of Family Planning No.	Users of Family Planning No.	X ²	P-Value
FPWSCC	1971	22.9 (485)	14.4 (174)	5.17	.024
	1972	25.8 (422)	14.7 (225)	10.03	< .005
	1973	20.5 (375)	14.3 (252)	3.57	.062
FPWS	1971	26.3 (377)	9.6 (178)	19.42	< .005
	1972	29.1 (326)	12.7 (212)	18.79	< .005
	1973	21.2 (278)	10.3 (244)	10.80	< .005
FPCC	1971	26.0 (524)	6.1 (33)	5.57	.020
	1972	20.8 (389)	15.9 (151)	1.39	.243
	1973	22.9 (319)	20.6 (204)	0.26	.636
FPed	1971	20.0 (594)	6.1 (33)	3.07	.084
	1972	25.2 (572)	9.1 (33)	3.56	.062
	1973	20.5 (474)	12.9 (116)	2.97	.088

health centers and these women were not included in our figures.

Individual Analysis

Because of limitations in the group level data, we have focussed more on individual data. Such an analysis requires specification of service inputs and the outcomes of services. This analysis was confined to fertility impact, primarily measured through changes in fertility status of individual women as related to use of service inputs^{*}. The expectation that outcome results may be significant seems reasonable because we have shown that birth rates fell by about 20 percent in some villages during the time that the number of women using family planning methods increased significantly.

Measurement of fertility reduction requires: first, selection of a reference mark - a level of fertility from which reduction is to be estimated; second, fertility reduction should also be related to a specific period during which the interventions were operative. These measures of fertility change should distinguish program impact from change occurring for reasons independent of program efforts.

Change in fertility from pre-program to program level was defined as follows: utilizing the information on duration of marriage (D_1) and

* This framework is similar to a production function relationship in econometrics indicating the process in bringing the perceived changes in fertility through program interventions. The objective in that approach is to derive functional relationships that map every combination of service inputs into the maximum attainable output (the frontier of production or the production function). This analysis primarily focuses on the fertility impact of services, but does not use an input-output framework because of the problem of disentangling of cause and effect sequencing in utilization of services and fertility decline, as explained later in the section.

the total number of live births (B_1) up to the end of 1969, average annual probability of birth ($P_1 = B_1/D_1$) was computed for each women to indicate a pre-program level of fertility. Similarly utilizing the duration of the program (D_2) and total live births (B_2) during the program up to the time the women withdrew from program exposure (outmigration, dissolution of marriage or closure of project which ever happened first), another average annual probability of birth ($P_2 = B_2/D_2$) was computed. The absolute decline ($P_1 - P_2$) in the probability of birth was then expressed as a percentage of the initial level (P_1). The percent decline in fertility from pre-program to program level used in the present analysis was $100(P_1 - P_2)/P_1$.

In the present analysis only women who had demonstrated pre-program fertility or women who had at least one live birth at the beginning of the program were included. Also, only women from the four groups of villages FPWSCC, FPWS, FPCC and FPED, which received family planning services up to 1974 were included in the analysis. Measurement of pre-program fertility of these women was based entirely on pregnancy history information obtained in the cross-sectional survey conducted at the beginning of the program. These pregnancy histories were updated up to the end of the program using longitudinal sources of birth data during the program. Information on pre-program and program fertility was available on 2298 women, though exact duration of program exposure was not known for 42 women. Socioeconomic data were available for only 1818 women and accordingly the multivariate analysis was performed on a total of 1818 women. We included other factors which influence fertility change. At the individual level, demographic variables like age and parity are very important. There are other

environmental factors which have significant effects on fertility disposition such as income, education, and indicators of social status. These can affect fertility outcomes not only through direct non-program inputs but also by introducing variation in the effectiveness of program inputs (e.g., education helps in effective use of services).

Health and family planning services were classified in nine categories - preventive and curative child care; women's services including illness care and surveillance and other services and maternity care; and general, motivational, service and follow-up family planning activities. For this analysis we reduced the classifications into 6 broad categories: women's services for illness (WILL), women's other services (WOTH)*, child care services for prevention (COTH), child care curative services (CILL), family planning - general and motivational (FPMOT), family planning services and follow-up (FPSER). In this categorization the type of personnel who delivered services was not taken into account and in each category services offered by all personnel were grouped together.

Results and discussion: The dependent variable was the decline in probability of birth during the project. Table 8.5 presents the distribution of women according to the range of decline. Of 2298 valid cases, about 18 percent had an increase in probability of birth, and about 4 percent had no change. Seventy-eight percent of women in the sample experienced a decline in the probability of birth although the amount of decline was rather low. More than 50 percent had a decline in birth probability of less than 20 percent, while a little over 20 percent experienced a decline of over 20 percent.

Table 8.6 shows the relationship between fertility decline and age.

* Maternity services for women was dropped from the present analysis.

Table 8.5

PERCENT DECLINE IN AVERAGE ANNUAL PROBABILITY OF BIRTH
FROM PRE-PROGRAM TO POST-PROGRAM LEVELS

Percent Decline in Probability of Birth	Number of Women	Percent
Negative	411	17.9
0	100	4.4
1-10	246	10.7
11-15	624	27.2
16-20	402	17.5
21-30	277	12.1
31+	126	8.5
Unknown	42	1.8
Total	2298	100.0

Table 8.6

DECLINE IN PROBABILITY OF BIRTH BY AGE OF WOMAN

Decline in Probability of Birth	Age of Woman			
	<25	25-34	35+	Total
Negative or No Change	216 (44.3)	238 (28.0)	57 (6.2)	511 (22.7)
Up to 20 Percent	102 (20.9)	326 (38.3)	844 (92.0)	1272 (56.4)
Over 20 Percent	170 (34.8)	287 (33.7)	16 (1.7)	473 (21.0)
Total	488 (100.0)	851 (100.0)	917 (100.0)	2256 (100.0)

The proportion of women who did not exhibit a decline in fertility decreased with age because these women had already completed child bearing. The magnitude of shift is shown by the fact that 44.3 percent of women in the <25 age group, 28.0 percent in the 25-34 and only 6.2 percent in the 35+ had either an increase or no change in fertility. Conversely, the proportion of women who experienced a moderate (up to 20 percent) decline in fertility increased with age: 20.9 percent of women in age group <25, 38.3 percent in 25-34, and 92.0 percent in 35+. High fertility declines (greater than 20 percent decline) were 34.8 percent in <25, 33.7 in 25-34 age group and only 1.7 percent in women over 35+. It is evident from Table 8.6 that variation between women in amount of fertility decline was greater in the <25 age group and least in the 35+ age group, presumably because the fertility of the older women was already low when the study started.

Among socioeconomic variables which influenced changes in fertility family income was considered first because it can act through a number of linkages. First, private inputs supplemented program service inputs influencing fertility and mortality. Second, income is an indicator of level of living and is presumably related to modernizing influences on members of the family. Higher family income should indicate better access to information about family planning and awareness of the desirability and feasibility of regulating fertility. Table 8.7 shows that the proportion of women who experienced either increase or no change in fertility decreased with income while a greater proportion of women belonging to higher income groups experienced declines in fertility. The association between fertility decline and income is significant ($\chi^2_4 = 14.6, p = .005$).

Table 8.7

DECLINE IN PROBABILITY OF BIRTH BY INCOME

Decline in Probability of Birth	Annual Income (Rupees)			
	<2000	2000-4999	5000+	Total
Negative or No Change	224 (25.2)	110 (22.3)	89 (17.3)	423 (22.3)
Up to 20 Percent	487 (54.8)	285 (57.7)	296 (57.6)	1068 (56.3)
Over 20 Percent	178 (20.0)	99 (20.0)	129 (25.1)	406 (21.4)
Total	889 (100.0)	494 (100.0)	514 (100.0)	1897 (100.0)

Caste is considered the most important indicator of social status in the Punjab. As can be seen from Table 8.8 the proportion of women who experienced an increase in fertility was lowest and the proportions who experienced reductions were highest in Jat-Sikhs. The findings were reversed in the Sch-Sikh group. The "others" group occupied a middle position.

Education of husband as indicated in Table 8.9 was associated differently with declines in fertility. The better educated group (sixth grade or higher) had an equal distribution of those who experienced an increase in fertility and those who had high declines (over 20 percent decline) in fertility during the program. At both these extremes the proportion of women was greater in the better educated group than in those who were less educated (fifth grade or below). The less educated group had a higher proportion with moderate decline (up to 20 percent decline) in fertility. These findings did not indicate a clear association of education with fertility decline. Similarly, there seemed to be no relationship of fertility decline with occupation (Table 8.10).

Thus far the analysis has showed individual relationships between the dependent variable and conditioning variables such as age and socioeconomic status indicators (income, caste, etc.). In order to evaluate the effects of service inputs on the dependent variable, it is important to control for these variables. A multiple regression model was therefore used to partial out the effects of the service inputs on the dependent variable. Table 8.11 presents the regression results with the percentage decline in the average probability of birth per year of exposure as the dependent variable. The results show that the effects of the six service inputs, when controlling for various socioeconomic variables, are not in the direction expected.

Table 3.8

DECLINE IN PROBABILITY OF BIRTH BY RELIGION-CASTE

Decline in Probability of Birth	Religion-Caste			
	Jat-Sikh	Others	Sch-Sikh	Total
Negative or No Change	212 (18.8)	82 (23.2)	214 (26.3)	508 (22.2)
Up to 20 Percent	604 (53.6)	197 (55.7)	469 (57.7)	1270 (55.4)
Over 20 Percent	310 (27.6)	75 (21.2)	130 (16.0)	515 (22.5)
Total	1126 (100.0)	354 (100.0)	813 (100.0)	2293 (100.0)

Table 8.9

DECLINE IN PROBABILITY OF BIRTH BY EDUCATION OF HUSBAND

Decline in Probability of Birth	Education of Husband (grade passed)		
	0-5	6+	Total
Negative or No Change	318 (20.5)	171 (28.8)	489 (22.8)
Up to 20 Percent	950 (61.2)	261 (43.9)	1211 (56.4)
Over 20 Percent	285 (18.4)	162 (27.3)	447 (20.8)
Total	1553 (100.0)	594 (100.0)	2147 (100.0)

Table 8.10

DECLINE IN PROBABILITY OF BIRTH BY OCCUPATION OF HUSBAND

Decline in Probability of Birth	Occupation of Husband				
	Farming	Labor	Service	Other	Total
Negative or No Change	178 (20.3)	139 (24.6)	93 (28.0)	88 (22.4)	498 (23.0)
Up to 20 Percent	497 (56.7)	343 (60.7)	140 (42.2)	236 (60.2)	1216 (56.1)
Over 20 Percent	202 (23.0)	83 (14.7)	99 (29.8)	68 (17.3)	452 (20.9)
Total	877 (100.0)	565 (100.0)	332 (100.0)	392 (100.0)	2166 (100.0)

Table 8.11
REGRESSION RESULTS

Dependent Variable: Percentage Decline in Average Annual Probability of Birth

Variable	All Ages			<25			25-34			35+		
	Regression Coefficient	t value	t	Regression Coefficient	t value	t	Regression Coefficient	t value	t	Regression Coefficient	t value	t
FP Motiv. (FPMOT)	-.5166	6.2	2.5	-.6930	2.5	3.5	-.4964	3.5	4.0	-.2018	4.0	4.0
FP Serv. (FPSE)	.1552	2.9	1.3	.2737	1.3	2.8	.2218	2.8	.3	-.0082	.3	.3
Women Ill (WILL)	-.0095	.3	.4	.0601	.4	.8	-.0339	.8	-	-	-	-
Women Other (WOTH)	.0859	1.7	2.3	.4247	2.3	.3	-.0228	.3	1.4	.0363	1.4	1.4
Child Other (COTH)	-.0289	3.6	1.4	-.0323	1.4	1.9	-.0232	1.9	3.1	-.0213	3.1	3.1
Child Ill (CILL)	-.0022	0	.4	-.0351	.4	0	.0052	0	-	-	-	-
Jat-Sikh	5.3998	6.2	2.2	14.7814	2.2	1.5	4.9112	1.5	-	-	-	-
Sch-Sikh	-1.6055	.9	.9	-5.1730	.9	.3	-.7339	.3	.7	-.5438	.7	.7
Education	-.3181	2.0	1.5	.7706	1.5	.6	-.1576	.6	1.0	-.1027	1.0	1.0
Income	.0002	1.5	.3	-.0002	.3	1.6	.0004	1.6	2.7	.002	2.7	2.7
Farming	-5.0605	2.6	1.2	-11.5980	1.2	2.2	-7.3550	2.2	.5	.4857	.5	.5
Labor	-.7639	.3	.3	-2.2530	.3	.5	-1.8507	.5	.6	.5721	.6	.6
Service	-.7442	.3	.5	3.5560	.5	1.3	-4.4415	1.3	.4	.4967	.4	.4

R2 = .052 R2 = .089 R2 = .058 R2 = .056

FP motivation services are significantly but negatively associated with decline in fertility. Family planning services and follow-up has a consistent but not significant positive association with the decline in fertility. Child preventive services are significant but the association is negative. Among the conditioning variables, membership in high caste (Jat) group and farming (occupational) group were significant.

The negative association with some of the service inputs may be caused by the fact that the use of some of the services, e.g., health services for women and curative services for children are related to the occurrence of births which generate a large number of required children's services. Utilization of services then represents a response to need produced by births rather than measuring a factor which could contribute to a decline in fertility. The negative association between fertility decline and male family planning motivation may represent the result of intensive efforts on the part of the motivators to influence resistant clients or a specific focussing of effort on high fertility couples. It is apparent that this analysis did not permit a clear definition of cause and effect relationships between service utilization and fertility decline and this makes conclusions about the impact of services tentative, though suggestive in explaining the dynamics of the interactions.

Most women experienced a mild decline in fertility which is consistent with the overall trend in fertility. In all instances, the least utilization of services was related to moderate decline in fertility (Table 8.12). Those who had no decline or even negative decline were heavy users of services as were those who had high declines in fertility. These results

Table 8.12

MEAN NUMBER OF SERVICE CONTACTS BY TYPE AND PERCENT
DECLINE IN FERTILITY

Percent Decline in Average Annual Probability of Birth	Mean Number of Contacts					
	Women's Illness Services (WILL)	Women's Other Services (WOTH)	Children's Illness Services (CILL)	Children's Other Services (COTH)	FP Motivation Services (FPMOT)	FP- Service & Follow-Up (FPSER)
Negative	11.7	15.9	18.4	69.6	12.1	5.9
0	13.7	19.4	26.6	92.6	13.5	8.1
1-10	17.1	18.5	25.4	59.7	11.8	8.4
11-15	14.1	11.1	9.5	20.6	6.3	3.4
16-20	13.1	13.5	14.2	27.4	8.8	7.3
21-30	17.9	16.8	20.6	43.6	8.8	9.5
30+	12.9	16.4	15.4	61.3	9.2	8.0
Total	14.2	14.8	16.5	45.0	9.4	6.5

suggest that some of the heavy users were families where services were rendered in response to health needs generated by high fertility. The most relevant finding is that the remaining group of heavy users of services had substantial decline in fertility (16 percent and above) and these couples may be those in whom the fertility impact of services is beginning to be evident. It is apparent that the relationship between service inputs and the dependent variable is nonlinear. This non-linearity depreciates the value of the regression results in Table 8.11, and further analysis would require efforts to separate service utilization associated with increase in fertility from service utilization associated with decline in fertility.

The suggestion that the use of Narangwal services was partially a response to specific health needs arising from a pregnancy or birth was indicated by Figures 8.1 to 8.6 showing the relationship between mean number of service contacts and fertility decline, measured by change in average probability of birth. The first segments of the graphs show that for some women high utilization was associated with no decline or even a rise in fertility. In these cases services were presumably provided in response to the occurrence of births or pregnancies. In other cases field workers, such as male motivation workers, might have worked more intensively on high parity cases. For those women whose use of services in response to high fertility did not show a decline in fertility it is possible that an effect might have been seen if the program had been extended.

Figure 8.1
Relationship of Fertility Decline and
Women's Other Services

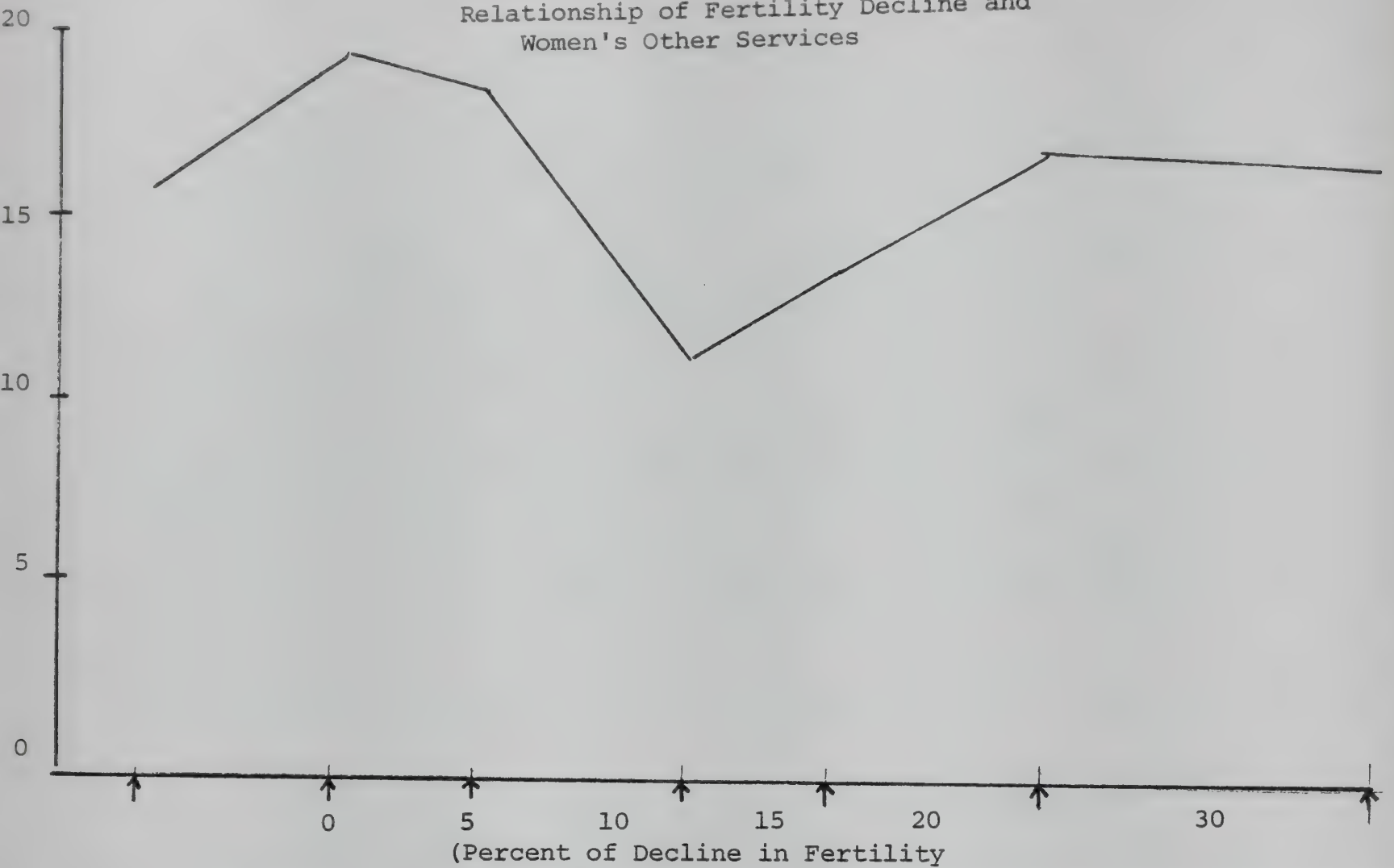


Figure 8.2
Relationship of Fertility Decline and
Women's Illness Services

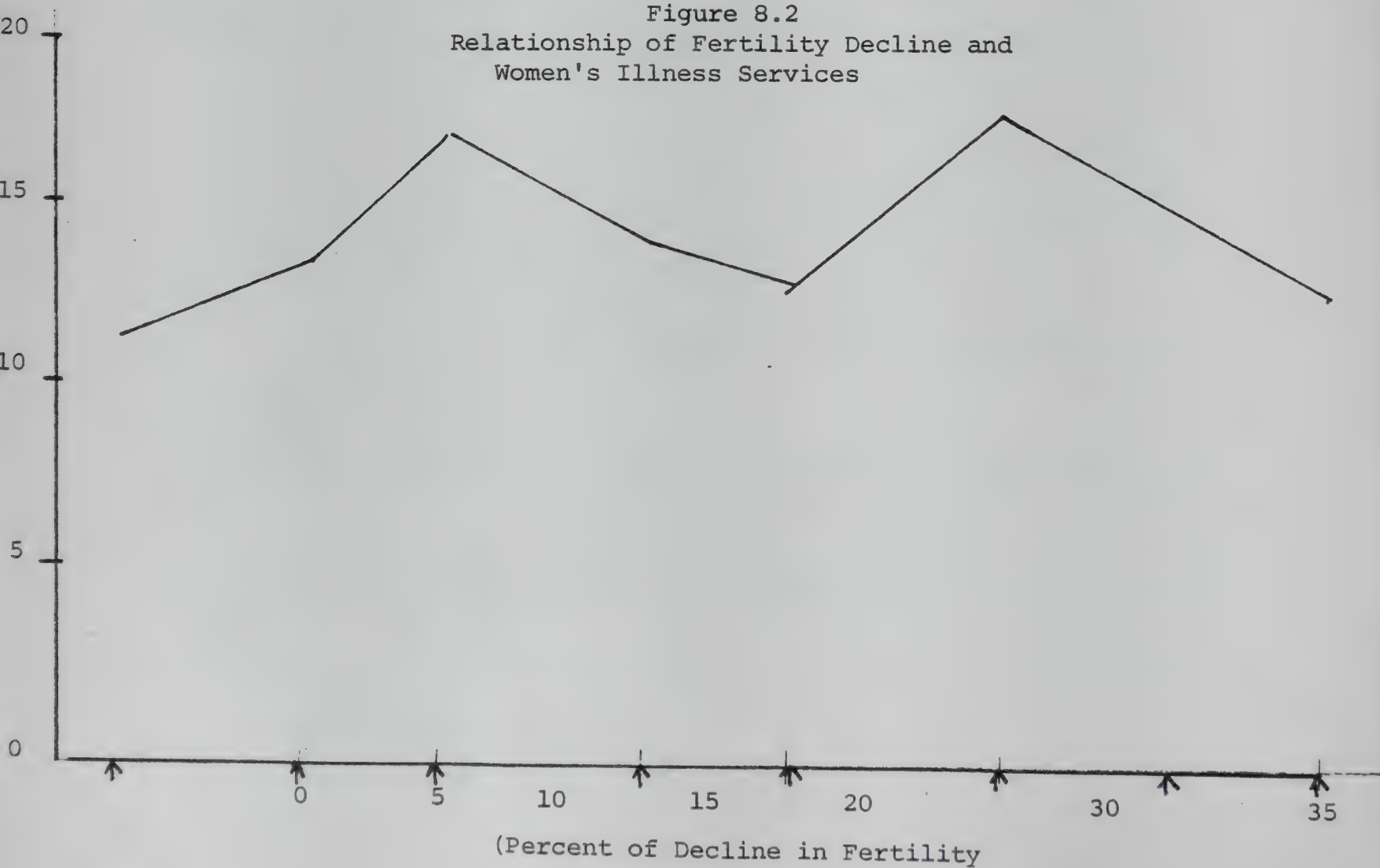


Figure 8.3

Relationship of Fertility Decline and FP Services and Follow-up

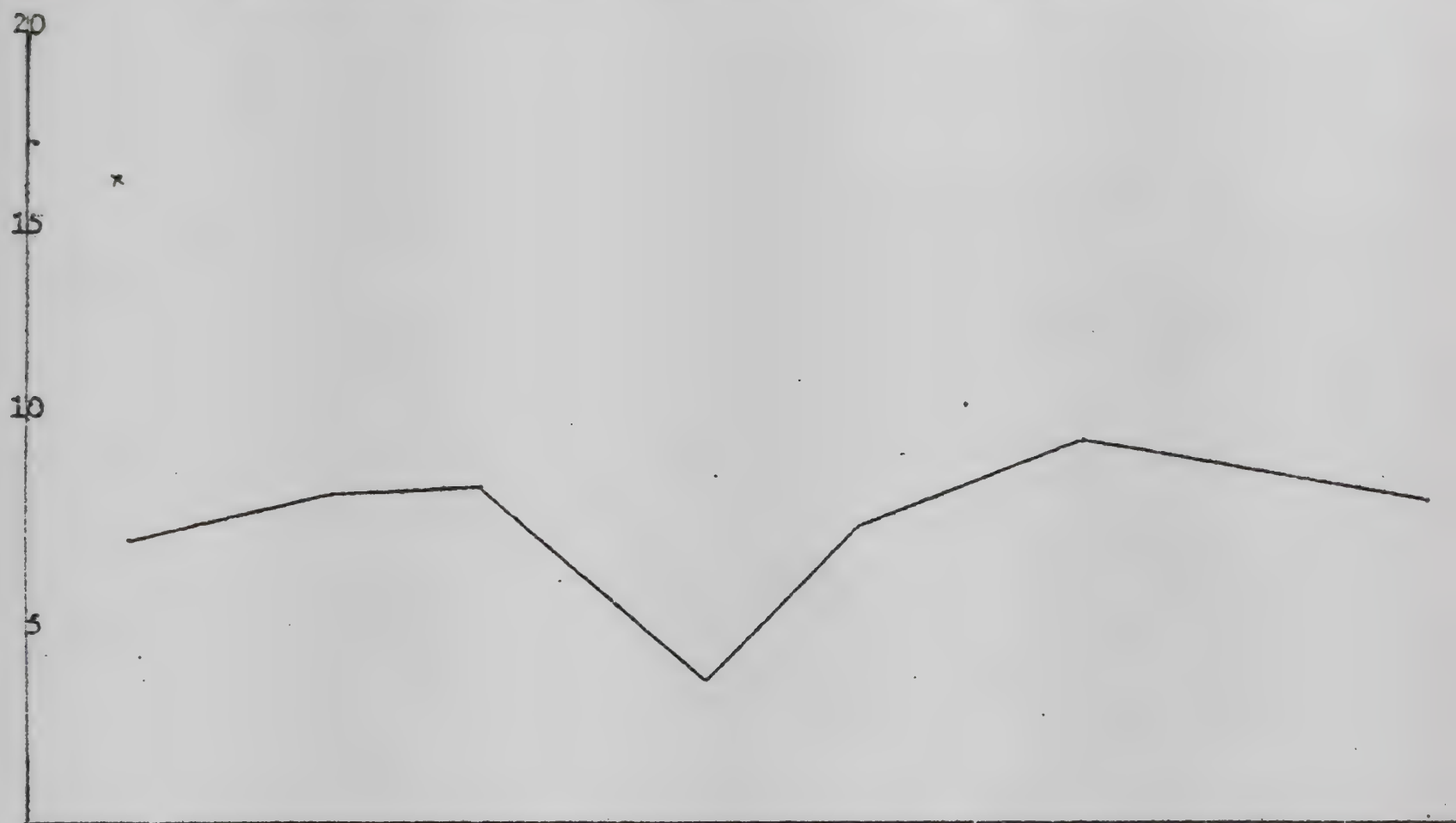


Figure 8.4

Relationship of Fertility Decline and FP Motivated Services

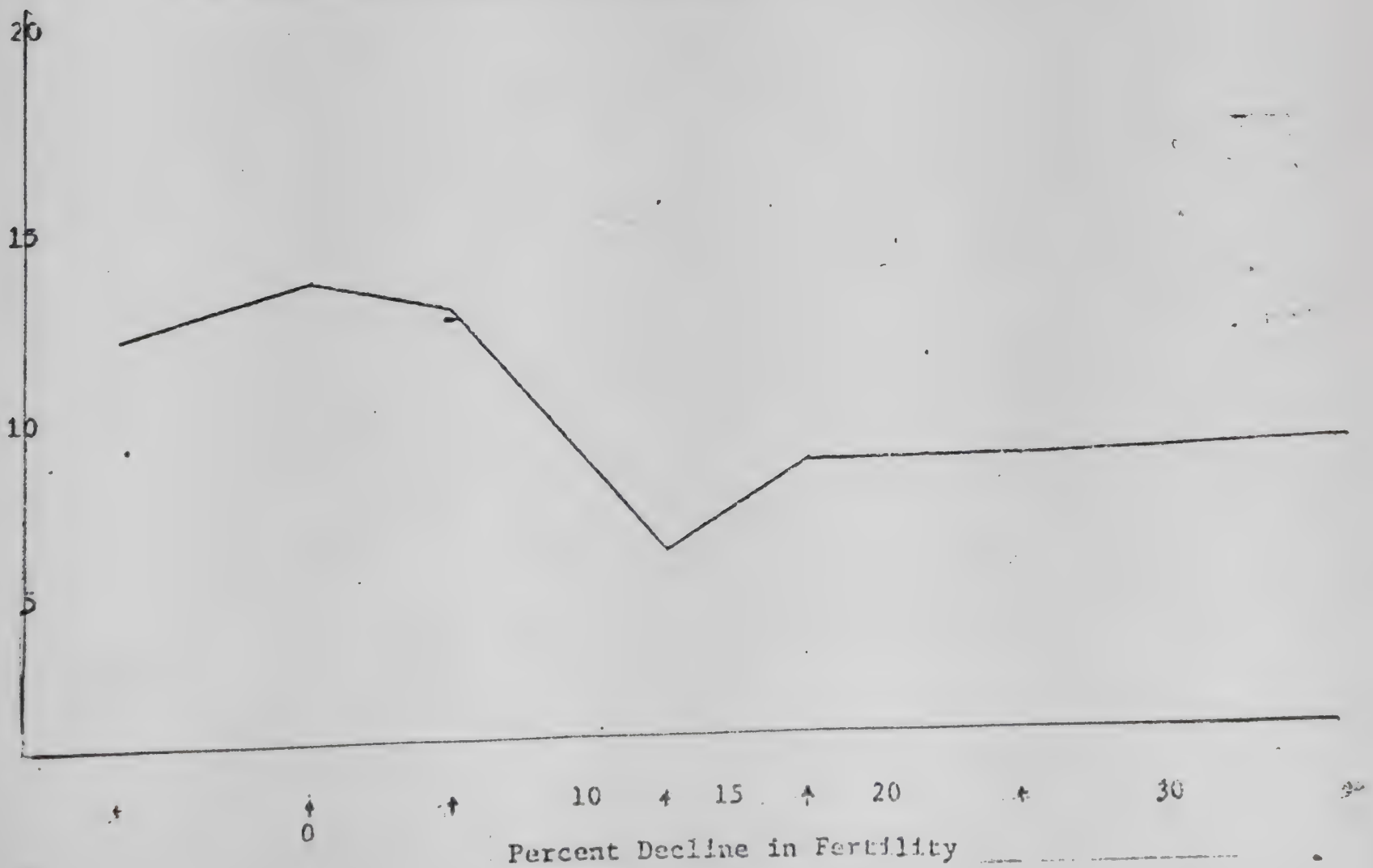


Figure 8.5

Relationship of Fertility Decline and
Children's Other Services

AVE. NO. OF SERVICE CONTACTS

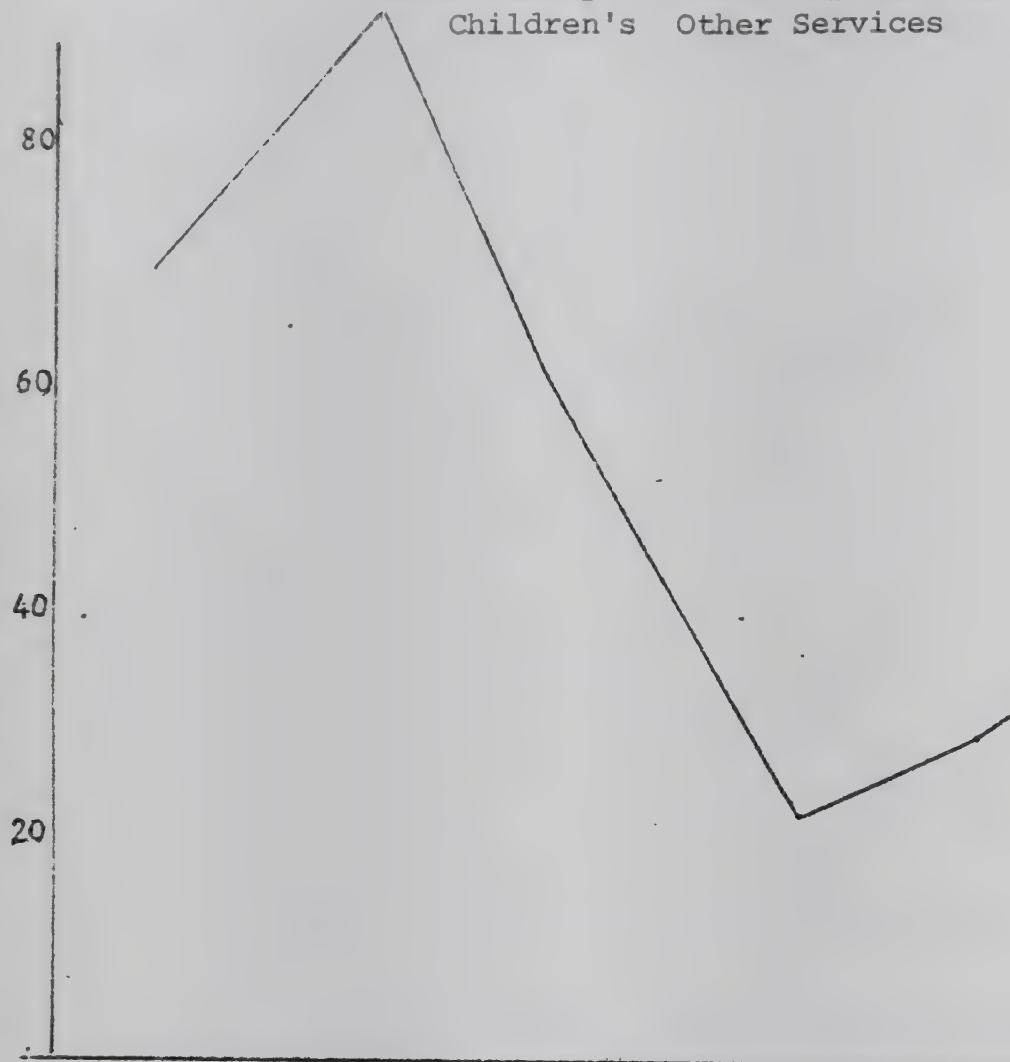
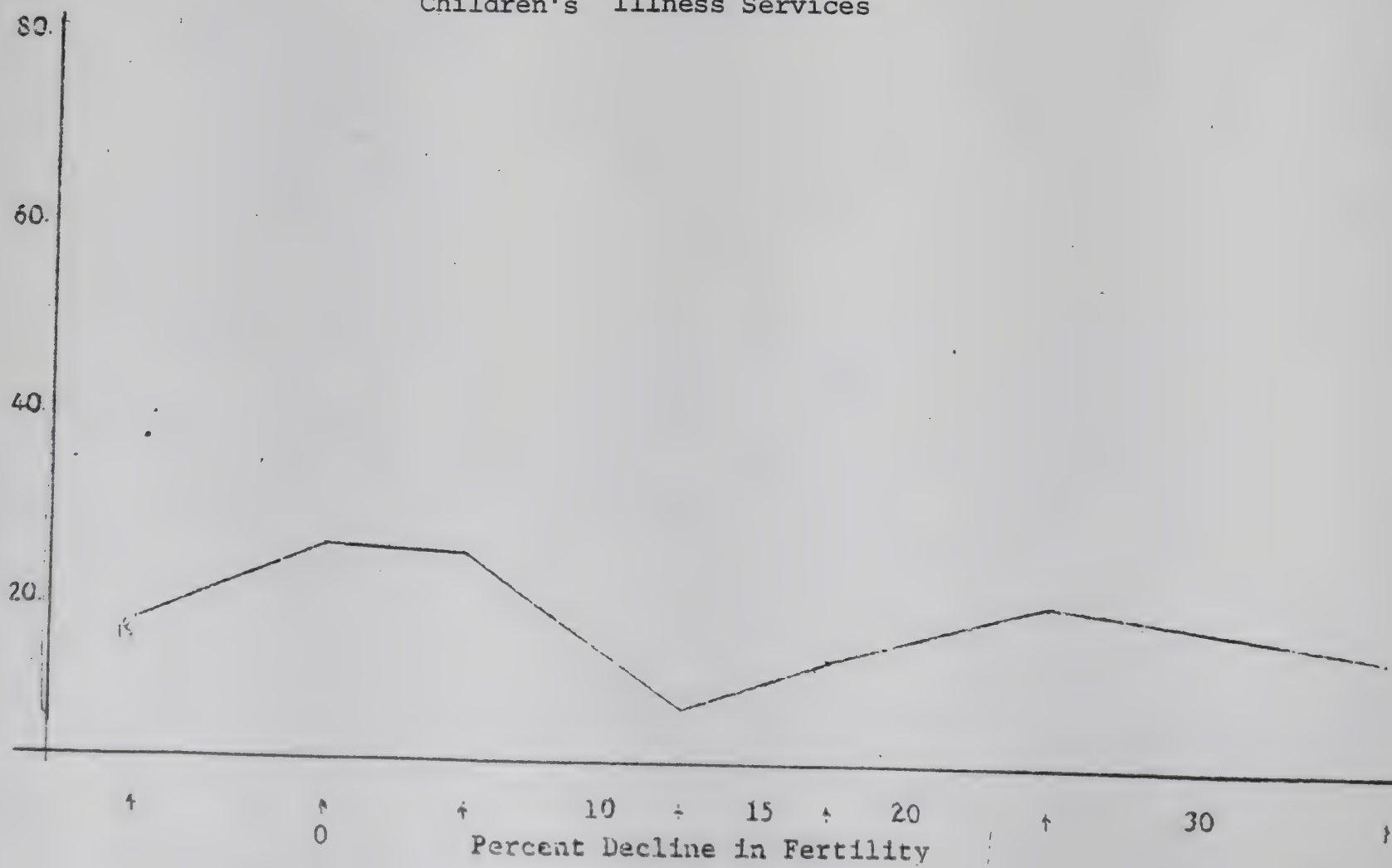


Figure 8.6

Relationship of Fertility Decline and
Children's Illness Services



The last segments of the graphs probably reflect the fertility impact of services with a heavy use of services being associated with a significant decline in fertility (16 percent and above). The low points in the midportion of the six graphs represent the cases who used services least. This slight decline of less than 20 percent in fertility was found to be consistent with the overall fertility trend among Narangwal women. There is no clear indication that a significant decline of fertility was related to a possible threshold point in the level of services.

As noted in Chapter 1, the field work in the Narangwal experiment did not continue long enough to demonstrate the full effect of services on fertility. However, the evidence for decline in probability of birth does indicate that services had some fertility impact. The results are generally consistent with the more detailed information on use of services, especially the practice of contraception.

POP MONOGRAPH

CHAPTER 9

POLICY IMPLICATIONS OF RESEARCH FINDINGS

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Hard data on complex policy questions have been presented in Chapters 2 to 8. This information will now be brought together to provide decision makers with a better base for making judgements about their own policy options. Quantitative data relating to each policy question posed in Chapter 1 will be summarized. Chapter 10 will present a qualitative and intuitive perspective of the background and implications within which these findings should be interpreted for field application. Evidence will be summarized in the sections that follow dealing with the greater effectiveness, efficiency and equity achieved in integrated services.

1. How does integration with health services facilitate family planning use?

The initial question posed in developing the project design was whether family planning and health services should be integrated. This will be discussed relatively briefly because the worldwide evolution of public policy seems to have answered this question in the affirmative. For largely political reasons, almost all countries and international agencies have decided that only integrated services are acceptable. Under the conditions of program integration achieved at Narangwal, the answer to the question of whether to integrate is unequivocally, Yes. The main questions now are what, when and how?

The effectiveness of services was measured in terms of output, defined as utilization of specific services, and in terms of outcome or the end results in health and fertility status. Because of the relatively short time for field observations, our most convincing evidence is in output measurements of greater practice of family planning. Fertility outcome measures were used mainly to confirm family planning results. Because health indices seem to respond more quickly, both ourput and outcome results are equally convincing.

The general issue of effectiveness can be addressed most simply by scrutiny of the change in rates of family planning acceptance and practice. In the cumulative acceptance curves (Table 2.1) all rates were still rising when the project terminated showing that integration in FPWSCC and FPWS achieved acceptance levels of 51 percent and 54 percent of all currently married couples in 4½ years time. FPCC reached 46 percent in 3½ years and FPEd reached 37 percent in 2 years. More important as an indication of program impact is Figure 2.2 which shows the new acceptors during the program period after previous users of modern methods of contraception had been subtracted. Now FPWSCC is consistently the highest curve reaching 44 percent, FPWS was 42 percent and FPCC was 38 percent. FPEd only increased to 20 percent. In Section 5 of this chapter strong reservations are expressed about data from FPEd which show that program impact in that group of villages was considerably less than seemed apparent at first.

Current user or practice prevalence rates were 34 percent for FPWSCC, 41 percent for FPWS, 28 percent for FPCC and 30 percent for FPEd. Effective-user rates are more precise and reflect the presumed fertility impact of the mix of contraceptives being used in each group of villages as calculated

from their effectiveness in the project: they were FPWSCC 24 percent, FPWS 31 percent, FPCC 21 percent and FPED 19 percent.

- a. What effect did prior use of traditional and modern methods of family planning have on program use?

Prior use of traditional and modern methods of family planning was by far the most important pre-disposing factor in predicting program use. Program use included all modern methods. Prior users of modern methods were most likely to become program users but prior exposure to traditional methods also had a favorable impact on program acceptance. This led to important distinctions between new recruits (non-prior users), those who changed methods (former users of traditional methods), and those whose use of modern methods through the program represented a change of source of supply (former users of modern methods). The potential impact of program acceptance differed markedly among these three groups, and sociodemographic characteristics were different within the groups as well.

The influence of preprogram use on program use is indicated by data (Table 2.10) showing the percent of couples who became program users of modern methods according to whether they had previously used: modern methods 57 percent, traditional methods 38 percent, and non-users 30 percent.

Prior users of modern methods were more likely to be from the Jat-Sikh caste, from families in which the husband was more highly educated and in a service occupation, and with the wife in the 25-34 age group and of high parity. Although all of these factors were highly significant statistically, the parity effect ($\chi^2 = 97.31$, $p = .001$) was especially striking (Tables 2.12 through 2.16). In the subsequent discussions of equity, data are presented to show that most of these differences were eliminated by integrated services.

- b. What components of health services are most effective in promoting family planning use?

Program use of family planning was closely associated with use of health services classified along two dimensions, first to distinguish between women and children recipients, second to distinguish between client initiated care for illness and provider-initiated provision of "other" services.

Since program acceptance of family planning was related both to prior contraceptive use and to program use of health services, it was important to ascertain how these factors related to each other. The analysis was especially critical inasmuch as it was found that women who were prior users of family planning were more likely to receive health services for themselves but not for their children.

The three-way analysis (Table 4.7) revealed that illness care, especially for children, had a roughly additive effect on program use of family planning, regardless of whether there had been prior use of FP. Holding the latter constant, use of illness care for women's problems increased the probability of family planning acceptance by 14-22 percent, while child illness care produced a 20-31 percent increase in family planning acceptance. In contrast, the effect of "other" services was most marked among non-prior users of family planning producing a 2 to 3 times increase in program family planning (from 20 to 50-60 percent increase). Among prior users of traditional methods women's other services increased program family planning from 35 percent to 55 percent and children's other services produced an increase from 24 percent to 66 percent. Since provision of "other" services was largely program initiated, they could be especially targetted to those who had never used family planning or had used only traditional methods.

Those with prior experience of family planning tended to respond spontaneously to the availability of family planning and health services; therefore, program initiative seemed to be less important.

c. When and in what sequence should services be integrated?

Analyses of the timing and sequence of relationships between health service use and practice of family planning showed that the strongest association occurred when services were concurrent. Detailed analysis of the use of services in two time periods of about 2 years each indicates that continuing users of health services were no more likely to accept family planning than those who used health services in the time period in which contraceptive use started. (Table 4.2).

When volume of health care visits by type of service was related to the timing and continuity of family planning practice an even closer relationship was demonstrated (Table 4.3). For women's illness services the number of visits in 1969-71 was largest for those who practiced family planning in the same years, 12 percent less for those who practiced family planning continuously, 25 percent less for those who practiced family planning only in 1971-72, and 33 percent less for those who never practiced family planning. For children's illness care even greater variation in the number of visits was found in association with family planning use, ranging up to 55 percent more for concurrent users than non-users.

The project initiated other services for surveillance and prevention had much more universal coverage and showed less direct concurrent relationship with family planning use than illness services which depended on parent initiative. The only possible association was that new recruits to family planning late in the project seemed to have received somewhat more children's other

services during the period of successful recruitment to family planning

A converse relationship of early acceptance of family planning leading to greater use of health services was not demonstrated.

in light of practical experience described in the next chapter, these findings strongly support the general policy that was developed to promote the use of entry points to introduce family planning into health service routines. A systematic process of defining activities in the care of both women and children that can be used most effectively to promote concurrent practice of family planning has been shown to be readily incorporated in the day-to-day work of FHW's.

- d. What sociodemographic factors influence the effectiveness of integrated services in promoting family planning?

The findings thus far indicate that program use of family planning was strongly influenced by prior use of either traditional or modern methods and even more strongly influenced by concurrent use of health services. These observations now need to be placed in perspective with all of the other variables influencing family planning practice which have been the focus of most previous research on family planning. These factors were also found to be significant in our study but they were much less important in the strength of their statistical associations than health services or prior use. Their impact tended, however, to be additive to health services use.

The strongest attitudinal influence was a general expression of approval of family planning and this had a clear additive relationship with use of women's illness services. Women (Table 5.1) who made continuing use of health services and approved of family planning had twice the program use of family planning (60%) as compared with couples who were non-users and ex-

pressed disapproval of family planning (30%). The difference was even more marked in comparison with those who were uncertain about family planning, a group who showed their negativity in many ways. In this relationship health services use had twice as much effect as the attitudinal variable.

Results were even more dramatic with other types of health services with women's other services producing three to 12-fold greater impact than the attitudinal variable, children's illness care 6-7 fold and children's other care producing 4-8 fold differences.

The analysis found that children's services influences family planning acceptance in a consistent fashion regardless of what women's initial attitudes and beliefs were. In fact, Table 3.9 shows that the volume of child care use was highest among those women who disapproved of family planning and were uncertain about whether more children die, yet the family planning effect of these services on those women was just as strong as on women with more positive attitudes. Child care services then can serve as an especially useful vehicle for health and family planning education to change negative attitudes and encourage family planning use.

Throughout the analysis an attitudinal variable that emerged as a consistently important indicator of social behavior was whether women talked with their husbands about family planning. We have come to consider this as a proxy for women's participation in family decision making. This variable had a stronger association with family planning practice than any other social factor. It was almost as significant as health services use (Table 5.2). The strongest association was with illness and other services for children with seven-fold differences between women who did not use children's services and did not talk with their husband (10 percent) as compared with those who

used services and talked (70 percent). The obvious potential policy significance is that just as health services can be provided it should also be possible to promote family communication so that parents talk about family planning. Children's health care seemed to be an outstanding channel for promoting such discussions. There is clear evidence that use of health services proved to be especially important in promoting family planning among couples who had not previously discussed family planning.

A demographic variable that consistently was found to be statistically significant in explaining contraceptive practice was the actual number of children who had died. Table 5.10 shows that in a regression analysis where many other variables were submerged this still remained significant. This relationship between child death and resistance to family planning was one of our strongest indicators that the child survival hypothesis does in fact work as we have postulated and that it will be susceptible to manipulation by a deliberate program to increase the awareness of child survival to promote family planning use.

The next variable considered was belief about the frequency of child death. Initially this was significantly associated with use of family planning (Table 2.18). By contrast with many variables studies which were additive the important observation here is that this was apparently submerged in the regression by actual occurrence of child death (Table 5.10). Use of health services overcame whatever differentials previously existed in beliefs about child survival, producing essentially equivalent practice of family planning regardless of earlier beliefs (Table 5.3). Within this

relationship, the maximum use of family planning was in couples who made continuing use of each of the types of health services through the project, and a somewhat greater impact was found among those who made most use of children's other services.

Other socioeconomic variables of caste (Table 5.4), income (Table 5.5), land ownership (Table 5.6), material possessions (Table 5.7) and husband's education (Table 5.8) all were much less strongly associated with family planning use and especially when compared with health services. Services seemed to overcome any differentials that had been present. This was especially true of children's services.

The special efforts to promote husband's motivation showed a similar highly significant additive effect (Table 5.9), in association with approval of family planning and talking with wives. A slight relationships with beliefs about child death was found but essentially no effect of other socioeconomic variables was observed since service contacts obscured other relationships.

A further analysis was done on attitude change during the project to see if project services might have directly modified the attitudinal factors. (Tables 3.8 and 3.9). The only measurable change was an indication that both women's services and children's services limited any tendency to move toward disapproval of family planning but did not increase movement toward approval. Similarly, children's services limited movement toward the belief that more children die ($p < .02$) but did not specifically contribute to the attitude that more survive. These basic attitude changes would presumably have been greater if the project could have been continued longer.

e. Who should be involved in providing integrated services?

The basic philosophy of primary health care as defined at

Alma Ata (Ref) is that a major responsibility of the health system is to increase the capacity of families and communities to solve their own health problems. This requires a reallocation of roles. The Narangwal experience showed that delegation of activities as far to the periphery as possible improves coverage and effectiveness. Interventions should be as simple as possible, limited in number, kept within local resources and organized so as to encourage participation of the individual's involved, especially the mothers.

The most important health worker in the world is the mother. More health care is provided by mothers than any other type of health worker. Their regular home responsibilities include a wide range of health activities to maintain nutrition, improve home sanitation and personal health habits, monitor their children's health and institute early treatment when needed. The peripheralization of health activities as carried out in the Narangwal project provides strong support for the conviction that the most important changes needed are in routine health practices in the home, backed up by acceptable village level auxiliary health care with professional support. Health and family planning practice were directly modified by systematic services with the result that they became part of a new pattern of social behavior.

Next to the mother, the most important health care provider at Narangwal was the family health worker (FHW). They were responsible for 90-95 percent of all health service contacts (p.3.5). All other activities and services were designed to support their activities. FHW's put in 76 percent of the total health and family planning service time in the project. Male family planning workers (FPW) put in 13 percent of the

service time; family health supervisors (FHS) time devoted to supervision of services was 4 percent, and physician time for in-service supervision and consultation was 6 percent of service time (p.6.5). Male FPW's provided a varying proportion of the family planning contacts: In the FPWSCC villages 20 percent; in FPWS villages 35 percent, in FPCC villages 60 percent, and in FPED 5-10 percent. FHWS and female family planning educators in FPED (FPEs) provided most of the remaining family planning contacts, ranging from 35 percent in FPCC villages to 80 percent in FPED villages (p. 3.5).

The greater efficiency of integrated services is indicated by the variation in time spent per contact by FHWS and FPEs, which in 1973 averaged 4.4 minutes in FPWSCC; 5.7 minutes in FPWS and in FPCC; and 14.3 minutes in FPED. (Table 6.1)

Overall it is estimated that 70-75 percent of the FHWS total work time in Narangwal was spent in service and the balance in research (p. 6.5). If the average coverage of FHW's per population unit in the project were adjusted to eliminate the time spent in research, it is calculated that their population coverage for an equivalent purely service load would have been one FHW per 2000 to 3000 population. Further simplification of services and involvement of community volunteer workers would be needed to increase their coverage to the 5000 population planned for in the national program.

f. What was the effect of integration on the types of family planning methods used?

A consistent process of moving from less effective to more effective contraceptive methods was facilitated by integration (Table 2.10). Of 1316 couples who had never used either traditional or modern methods of family planning 65 percent did not become program

users, 30 percent used various temporary but modern methods, and 5 percent accepted sterilization. Of 847 couples who had previously used traditional methods 54 percent did not use program family planning, 38 percent used modern temporary methods, and 8 percent permanent methods. Of 344 couples who had previously used modern temporary methods, 27 percent did not use program contraception, 57 percent continued to use temporary methods and 16 percent accepted sterilization. A remaining 106 couples had been sterilized earlier. Eventually 27 percent of all program users had accepted permanent methods. Among this group, 36 percent had been sterilized before the project started, 33 percent shifted from modern to permanent, 16 percent from traditional to permanent and 15 percent went directly from no use to permanent methods.

g. What impact on fertility was achieved?

Measured fertility decline has to be considered in the context of the general secular decline in the Punjab. Our population groups were kept small because of the need to concentrate field resources to get definitive data. Recognition of the fallability of fertility measurements in any small population had led us from the beginning to deemphasize the importance of fertility as an outcome measure. We expected from our sample size to have a standard error of ± 2 points in annual birth rate figures. This variation would be accentuated by the periodic fluctuations which are found in any annual fertility figures even in large populations. Because of underreporting in any pregnancy history data and the fact that longitudinal data collection in 1969 was not complete, we feel more confident of our figures from 1970 to 1973 (Table 8.3). During these

four years FPWSSC crude birth rates were 36.7, 34.4, 32.8 and 29.0, a decline of 7.7 points or 21 percent. In FPWS the figures were 38.3, 33.2, 36.1 and 28.8, a decline of 9.5 points or 25 percent. In FPCC we have data from the concurrent nutrition project in these villages even though family planning services became effective only in the last three years, and they were: 34.2, 36.0, 29.6 and 33.3, a decline of 2.7 points or 8 percent. For FPEd we have only two years - 30.0 and 27.0 - a decline of 3 points or 10 percent. The population control village rates were 33.9, 34.1, 28.3 and 27.9, a decline of 6 points or 17 percent. The general decline and intrinsic fluctuations make it impossible to draw definitive conclusions. However, official government figures, analyses of our pregnancy history data and the results of the 10 year follow-up of the Khanna Project all indicate that the general secular rate of decline in the Punjab in the decade prior to this project and during this time was about 1 percent per year as compared with approximately 5 percent per year in our integrated service villages (Orange Book and Khanna Study).

Similarly, data on general fertility rates show equivalent declines. FPWSSC dropped from 196.5 to 166.7; FPWS from 208 to 163.4; FPCC from 205.2 to 170.9 then back up to 195.7; FPEd from 182.1 to 170.8 and Control from 192.6 to 165.5 (Table 8.2).

Specific analyses were done relating fertility to whether a couple practiced family planning during the previous year. The probability of a birth among contraceptive users was found to be one-half that among non-users (Table 7.11). Although we had achieved equitable distribution in use of family planning and health services we were not able to overcome caste differentials in fertility. Low caste showed greater fertility both among users of family planning and among non-users than

higher castes (Table 7.17). This was probably due both to less consistent use of good methods and the use of less effective methods.

Differentials in probability of births among users and non-users of family planning was found in all experimental groups. As an indication of the relative effectiveness of family planning, however, there were distinct differences in fertility, (Table 3.4), which were greatest ($p < .005$) in FPWS and in FPWSCC. In FPCC the differences were significant in only one year. In FPED no significant differences were found suggesting that there might still be a high level of family planning use from non-project sources.

A regression analysis of variables influencing the probability of a birth in any year showed that the three variables that emerged as most significant were previous parity, the time period since a previous live birth, and whether the couple had practiced family planning in the previous year (Table 7.20). Caste was barely significant but education and occupation were not significant. It was estimated that in the final full year of project activities (1973) the proportion of women in all experimental villages who had a birth was reduced to less than 20 percent. Without contraceptive use this figure would have been at least 12 percent higher with a fertility rate of 224 instead of 198 per 1000 women.

Age specific fertility rates showed that declines were occurring mainly above 30 years of age but that fertility among the young remained high. Birth intervals actually seemed less in the younger age groups of women who practiced family planning, 13-18 months as compared with an interval of 19-24 months in the other age groups. This may have been partly

due to a reverse relationship in that young women who had short birth intervals may have more readily accepted family planning.

2. What impact did integrated services have on health?

It should be obvious but it often seems to be forgotten that a major advantage of integrated services is that in addition to reduction in fertility there are also direct health benefits. The interactions need to be emphasized since family planning is itself an effective means of improving the health of mothers and children and similarly improved health seems to contribute to greater acceptance of family planning.

Definitive health data mainly relate to children under three years of age. Numbers were too small to show an impact on the usual indicators of health of mothers. Stillbirths, IMR and 1-3 year old child mortality were reduced by 32 percent to 50 percent in FPCC as compared with controls (Table 3.11). In FPWSCC results were more caste specific. Stillbirth reductions were concentrated in low caste women and this seems reasonable because they were the specific target population for the relevant interventions which were supplementation with iron, folic acid and selectively with calories; tetanus immunization; and general antenatal care. The infant mortality rate reductions, however, were more specifically focussed in higher castes in FPWSCC apparently because these services depended more on parent initiative in bringing children to the clinic in these villages. A major difference between FPCC and FPWSCC was in the frequency of morbidity surveillance in the home which was weekly in the former and monthly in the latter. This difference apparently was sufficient to explain the lack of a reduction of infant mortality rate in low caste infants in FPWSCC

whereas FPCC had close to a 40 percent reduction among the lower castes. Finally, services in FPWSCC actually did better in reducing 1-3 year child mortality than FPCC, perhaps because for children of this age even low caste parents more readily took the initiative in seeking care, early detection in the home was relatively less essential, and there was greater benefit from nutrition intervention directed to the poor.

Morbidity improved in response to health care as evidenced by shorter duration of the most common illnesses which were reduced by 14 to 33 percent (Table 3.12). This amounted to a reduction in total illness for each child of 20 percent or an average of 22 days per year. These results were achieved mainly by surveillance and early treatment with 90-95 percent of the care being provided by family health workers.

Growth increased dramatically for all children in study villages as compared with controls, with average weight differences of 0.5 kg and height differences of 2 cm. (Figures 3.3 and 3.4). Sex and caste impact on growth was additive to the program effects so that a male, high caste child from a study village was 2 kg heavier and 6 cm taller at 3 years of age than a female, low caste child from control villages. The number of siblings living also had an additive effect; if there were 2 male siblings and 2 female siblings a child averaged 0.5 kg and 1.3 cm less than a child with 0-1 living brothers. This is a powerful argument for the health benefits of family planning (pp. 3.38 and 3.41).

3. How can efficiency be increased in integrated services?

Even more persuasive in supporting the rationale of integrated services than evidence on effectiveness has been the extremely strong

evidence on cost/effectiveness. The most definitive finding is that integrated services not only provided family planning but also improved health and nutrition for only a moderate increase in overall costs. The more focussed analyses which follow showed precisely where the greater efficiencies were achieved.

The Narangwal data are unique because as much care and precision was devoted to measuring input as to quantifying output and outcomes. Using work sampling and service records analysis methods developed as part of our functional analysis methodology (Ref) we were able to relate detailed time allocation and cost information to specific benefits achieved.

- a. What components of integrated services were most efficiently provided for both family planning and health?

The better the balance of services provided in an experimental group the more efficient they became. By combining various activities in a single visit significant economies were achieved in both time and money. In addition, when the combinations made sense in the context of the village home there appeared to be a natural process of synergistic interaction in creating rapport and changing behavior patterns. Unfortunately, most categorical programs have no way of achieving these synergistic benefits, but they are readily included in services developed primarily to meet needs as they appear in a village home in a manner designed to promote community involvement.

The data indicate (Figure 6.1) that in integrated women's and children's

services there was a 20-34 percent saving in actual time spent in family planning compared with women's or children's services provided alone with family planning: a 35 percent saving in time for women's other services when provided with child care; and a 24 percent saving in children's other services when provided with women's services. These planned services at project initiative gave great opportunity for efficient combining of services. There was little difference in time spent on women's illness care when provided with or without children's services. The 58 percent reduction in time for children's illness care when provided with women's services was partly because of the planner difference in frequency of morbidity visits with FPWSCC homes receiving only monthly home visits for surveillance and FPCC receiving weekly visits. This difference in visits showed a significant impact by producing a greater reduction in infant mortality rates in FPCC than in FPWSCC. Illness care tended to take about twice as much time as other services in each experimental group mainly because several preventive services could be carried out in the same service contact (Figure 6.1).

By 1974 there had been considerable streamlining of FHW and FPE services and their input into the various service packages averaged between 400 and 500 minutes per week of direct service time (Figure 6.2). For family planning activities the weekly distribution of time for each group was: FPWSCC 37 minutes; FPWS 83 minutes; FPCC 57 minutes; and FPEd 249 minutes. Friendly relations and rapport took 113 minutes in FPEd, as compared with 43-49 minutes by FHW's in the other experimental groups. The greater efficiency in the integrated women's and children's services (FPWSCC) continued to be evident.

The service records data on numbers of service contacts reflect essentially the same patterns that were defined by work sampling. Further evidence on the relative increase in efficiency is provided by the time per average service contact in 1973-74, which was shortest where integration was greatest: FPWSCC 4.4 minutes; FPWS 5.7 minutes; FPCC 5.7 minutes and FPEd 14.3 minutes (Table 6.1).

Other groupings of services can be devised using our data on individual components to maximize outcomes by emphasizing particular activities having specific effects. This approach which will permit selective emphasis on shifting priorities differs sharply from a purely categorical approach which is locked into only one priority.

- b. What are the trade-offs of various types of health services and sociodemographic variables in their impact on family planning?

A series of multivariate analyses were done to measure the relative strength of specific components of health services in comparison with various sociodemographic variables as they influenced the practice of family planning. They are discussed under efficiency largely because these measures of relative impact should help in evaluating trade-offs in allocation of resources to the several interventions tested.

In the first regression the dependent variable was acceptance of family planning classified as use at any point in the project. Use of health services was categorized as the number of years in which services were used during the initial three years of the project (1969-1971). Our greatest interest in this regression was in the set of independent variables which are manipulable in the sense that they can be modified directly in a program.

Highly significant as explanatory variables associated with acceptance of family planning were: one year of children's other services (10 percent); one year of women's illness services (5 percent); one year of male motivation services (10 percent); expressed approval of family planning (12 percent); and whether husband's and wives had talked about family planning (9 percent) (Tables 5.10 and p. 5.24).

The percentages indicate the relative contribution of each variable to increased use of family planning. Thus, women with these patterns of health services use and attitudes had contraceptive use rates 46 percentage points higher than women without such patterns, all other variables being held constant. If the service effects are linear in their relationships, a second year of health services use would presumably increase this to 71 percent. This continuing impact seems reasonable to assume since the family planning acceptance curves were continuing to increase steadily.

Other variables that were non-manipulable but also highly significant were age and parity (especially if a younger woman had over three children). Caste and occupation did not emerge as significant in this regression and husband's education was only barely significant. Awareness of family planning was not significant but prior use was highly significant. These baseline variables together added 10 percent to explaining the increase in acceptance of family planning bringing the total contribution of the variables to the use rate to 82 percent. Also highly significant was the actual number of children who died, but beliefs about child mortality seemed to have been submerged by actual mortality with which it was significantly correlated. In balancing health services against all socioeconomic variables it seems relevant

that this regression dealing with initial acceptance of family planning showed more impact from non-service influences than other regressions which dealt more with continuity, but even here the effect of health services was much greater than non-service influences.

In the second regression the service variables were expressed in terms of the number of service contacts rather than simply comparing use with non-use. Most of the other variables maintained the same relationship to acceptance as in the first regression. The service variables, however, were now all significant and in the following order of relative importance: women's other services, women's illness care, children's other services and children's illness care (Tables 5.12 and 5.13). Women's other services did not show up in the first regression because essentially all women were covered but when frequency of contact was introduced it proved very important. The explanation for the emergency of children's illness services is that the previous regression was using data from only 3 years of health care while the second regression used 5 years of data, suggesting that there was a cumulative effect from the longer period of observation. Male motivation services were shown to be important in gaining acceptance but continued effort after 10 contacts was shown to be counterproductive and resulted in a falling off of family planning use, probably indicating the increased effort required to recruit from a more resistant supply of potential acceptors.

The third regression used measures of total duration of family planning use as the dependent variable in addition to using volume of health service contacts as in the second regression. Prior use of contraception and all service variables again were highly significant in explaining continuity of family planning use. As in the previous regression, there was even

stronger evidence of a negative association with male motivational contacts after an initial positive effect. None of the socioeconomic variables were now significant, except for a slight association with farming occupations.

- c. What cost considerations are important in decisions about integrating various components of health services with family planning?

The overall cost of Narangwal integrated services (FPWSCC) was Rs 16.7 (\$2.2) per capita per year. By comparison FPWS was RS 13.5 (\$1.8), FPCC was Rs 19.3 (\$2.6) and FPEd was Rs 8.7 (\$1.2) per capita per year (Table 6.3). Because of the marked differences in output, however, these costs should be related to particular benefits in order to obtain a more accurate picture of efficiency. All such calculations showed unequivocally the greater cost/effectiveness of integrated services.

First, it is necessary to partial out the costs for various parts of the services (Table 6.2). The salary component varied greatly ranging from 45 percent for FPWSCC to 71 percent for FPEd. This is in comparison to government primary health centers where the salary component is 75 percent, leaving very little to cover the chronic shortages in drugs and supplies which totally paralyze the potential effectiveness of the rest of the health investment. The fact that the drug component was 10-15 percent and supplies 6 percent in the integrated packages supports the conclusion that if integrated services were to be provided these essential expenses could be relatively small and readily funded. Although we did not actually test the option we did get evidence from

sample surveys to indicate that people were eager to pay directly for drugs, probably because they had more confidence that the quality would be good. The facade of pretending to provide free care and then not supplying sufficient drugs is a cruel deception in any system.

Similarly, 7-11 percent of costs were for vehicles and transport. The reality is that effective services cannot be run without realistic provision of transportation. Finally, the allocation needed to amortize building costs was only 1 to 2.5 percent of total costs or about Rs 200 (\$25) per year because we relied mainly on working with the panchayats to fix up village facilities provided by them. This calls into question the excessive concentration on investments in buildings in most primary health care programs with little concern for the long term implications of adequately providing for recurring costs.

A functional classification coming from the detailed cost analysis gives even more insight into the options. In each instance the integrated services cost 1/3 to 1/2 of the particular service cost when a service was given alone (Table 6.3). On an annual per capita basis, child care was Rs 4.2 (\$.56) in FPWSCC, but Rs 8 (\$1.07) in FPCC, and nutrition care was Rs 4.5 (\$.60) and Rs 6.5 (\$.87). Women's services were Rs 4.5 (\$.60) in FPWSCC, and Rs 6.6 (\$.88) in FPWS, and maternity care was Rs 1.7 (\$.23) and Rs 3.2 (\$.43). Family planning costs showed a particularly wide range from FPWSCC Rs 1.8 (\$.24), FPWS Rs 3.3 (\$.44), FPCC Rs 5.0 (\$.67) and FPED Rs 8.1 (\$1.08).

When costs were related to the number of service contacts the cost per contact ranged from Rs 1.4 (\$.19) to 2.7 (\$.36) per woman's or child's contact and from 5.9 (\$.79) to 9.8 (\$1.31) for maternity care contacts (Table 6.4). In government primary health centers the cost per curative

contact was Rs 1.5 (\$.20) indicating that differences in overall costs in government services as compared with Narangwal was due entirely to the dramatically fewer contacts provided by the government services. The cost per family planning contact, showed an even wider range: FPWSCC Rs 4 (\$.53), FPWS Rs 6 (\$.80), FPCC Rs 14 (\$1.87), and FPEd Rs 11 (\$1.47). The government cost per family planning contact was Rs 3.5 (\$.47) presumably reflecting multiple short "motivational" contacts with few service contacts involving provision of contraceptives.

To complete the efficiency analysis it was of special interest to relate Narangwal project costs to costs for other services being used in these villages (Table 6.5). Private annual per capita expenditures ranged from Rs 13 (\$1.73) in FPWSCC, to Rs 16 (\$2.13) in FPWS, FPCC and Control, and up to Rs 23 (\$3.07) in FPEd. The Punjab Government expenditures for health services used by village people ranged from Rs 1.5 (\$.20) per capita in FPWSCC villages and FPCC, to Rs 3 (\$.40) in FPWS villages, Rs 3.4 (\$.45) in FPEd villages and Rs 6.3 (\$.84) in control villages. Use of project services therefore produced a saving from other expenses of Rs 11.6 (\$1.55) per capita in FPWSCC as compared with FPEd and Rs 7.5 (\$1.00) as compared with controls. Combined costs were lowest in Controls Rs 22 (\$2.93), next in FPWSCC Rs 27 (\$3.60), and highest in FPEd Rs 35 (\$4.67) which fits other evidence that the latter villages had the most affluent populations, and were actively seeking private care.

Based on these analyses calculations of relative cost-effectiveness were made (Table 6.6). Cost per new family planning acceptor was Rs 92 (12.27) in FPWSCC, twice that in FPWS and three times that in FPCC and FPEd. Cost per couple year of family planning use was Rs 77 (\$10.27) in FPWSCC and 1.7 times that amount in FPWS, 2-1/2 times in FPCC and 3 times in FPEd.

When all health costs were attributed to the prevention of mortality the total child care costs per child death averted came to Rs 5616 (\$749) in FPWSCC and only slightly more in FPCC. More detailed calculations separately allocated costs to mortality reduction and to morbidity improvement and nutrition impact in FPCC (Table 6.7). The cost per perinatal death averted was now Rs 74 (\$9.87), for an infant death averted it was Rs 280 (\$37.33) and for a 1-3 year old child death averted it was Rs 761 (\$101.47). The portion of the costs attributed to morbidity reduction resulted in calculations of the cost of a day of illness averted to be Rs 4 (\$.53) for an infant and Rs 3 (\$.40) for a child 1-3 years of age. Finally, using the portion of costs attributed to nutrition it was possible to calculate the cost per additional centimeter growth at 36 months of age as Rs 197 (\$26.27).

- d. What specific management and organizational changes are needed to promote integration?

These issues are discussed in general terms in Chapter 10 in the perspective of general project experience rather than specific data. Specific data, however, are available to support the following practical conclusions.

Health and fertility surveillance using lists of all married reproductive age women (couples) and children under 3 years of age is an outstandingly important activity which can be built into routine services. An effective balance of at least 50 percent preventive services per woman and child was maintained in Narangwal (Ref: Orange Book) with surveillance being the main instrument to achieve effective outreach. A tight management structure is needed to ensure that surveillance is not limited to data gathering but includes an appropriate response to problems identified either in individuals or in groups. A difficult management issue is to ensure that outreach services are not subordinated to clinical emergencies showing up spontaneously. Overloading that results in cancelling of outreach services

to take care of clinical emergencies will quickly destroy the surveillance system. A balance must be achieved either by decreasing the population to be covered or by decreasing the range of service responsibilities.

The Narangwal findings demonstrate the need for peripheralization of services reaching into the home. In balancing the mix of the various kinds of services a basic management decision is how to target activities that will reach specified populations. The characteristics that emerged as important in these studies suggest the following principles.

1) Prior users of family planning tend also to be health services users and therefore they require less concentrated outreach efforts. They will come for services anyhow. The nature of the integrated service contact is, however, especially important for these people. The use of appropriate entry points to link family planning and health services should be carefully worked out.

2) Non-users of family planning will require a much more focussed outreach approach. Evidence which has been summarized above shows that both women's and children's other services were especially important in reaching individuals who had not previously used or did not spontaneously approve of family planning. This will not happen automatically with outreach services but can be promoted by direct entry point linkages between health and family planning services.

4. How can integrated services achieve equitable coverage of total village communities?

The three principal parameters measuring performance that we have used are effectiveness, efficiency and now equity. Epidemiological

and health services definitions of effectiveness and efficiency are well standardized. Effectiveness measures the impact of a specific input on outputs or outcomes. Efficiency relates effectiveness to costs as measured by money, time or other indices.

Measuring equity has only recently become a dominant issue. Equitable distribution has emerged as one of the most important considerations in current thinking about basic mechanisms promoting international development. The evidence that a rapid decline in the rates of population growth in Sri Lanka and Kerala may have been related to equitable provision of minimum basic needs (Ref) has focussed even greater attention on the need to understand equity. The suggestion is that with equitable distribution of health services, education and nutrition, the poor will be as likely to limit their fertility as the rich. In achieving this kind of equity new approaches are needed to define the amount and mix of effective services that are needed for those who have been most neglected in the past - the women and children in socially deprived families. Our findings have major implications in making current rhetoric about social justice and quality of life practical and specific through quantification.

A major problem has been that there has been little agreement on the definition of equity. We have found the common definition to be totally inadequate since it refers usually only to providing equality in access to input. This would certainly be an advance in most situations but we feel that it is far from sufficient. A sort of affirmative action in collaboration between the health system and community is needed to measure current disparities in need, to adapt interventions to those in greatest need and to take the initiative in preferentially meeting those needs. The definition that evolved from these studies is that equity is when input is

adjusted to need to eliminate disparities in outputs and outcomes.

According to this definition actual measurements of equity should be based on concepts of coverage and surveillance. All measures of coverage require calculations based on population denominators. Surveillance requires calculations based on population denominators. Surveillance requires identifying those who are most at risk and monitoring key indices to identify problems and apply appropriate interventions early. Since all efforts should be within local resources these services should be provided with a high degree of regularity by the most simply trained and peripheral workers. Because the women and children in villages who have been most discriminated against normally have great difficulty in taking advantage of the usual patterns of access to services it is essential that all activities be brought as close to the homes of the poor as possible.

This can be done best when there is collaboration between the health system and the community. We have shown that the health system and the community can get agreement on health objectives. This can be achieved best by helping village leaders see that it is in the best interests of everyone to direct care to those in greatest need. The interventions are usually not threatening to village elites and thus should by-pass past patterns of discrimination in contrast to the usual rhetoric about income redistribution and land reform which typically produces considerable resistance among those who control resources at the community level. By using an approach which impartially seeks to provide care according to need it is usually not difficult to get leaders to enthusiastically support these focussed health and nutrition services.

- a. What socioeconomic variables showed the greatest differentials between groups in the baseline situations?

There was general interest in family planning as indicated

by the fact that traditional methods were being used equally in all caste groups (Table 2.12). Use of modern methods of family planning was primarily a high caste activity at the start of the program (Tables 2.12 and 6.10) but low caste people were beginning to be included.

Highly significant differentials in prior use were found when analyses were done by education and by occupation (Tables 2.13, 2.14, 6.10). Age distributions showed that the most use of modern methods of family planning was between 25-34 years of age (Tables 2.15 and 6.10). The number of living children proved to be an especially significant indicator, non-users had 2.9 children, users of both traditional and modern methods had 3.6, and those who had used permanent methods had 5 children (Tables 2.16 and 6.10).

Health status showed similar inequitable distribution which is discussed in detail in our companion report on the Narangwal Nutrition Project (Nut Monograph).

b. What changes indicate that a more equitable distribution of family planning was achieved by integrated services?

The most evident shift toward equity was in the percentages of new recruits to family planning. By concentrating on providing integrated services to those in greatest need, disparities were eliminated so that no significant differences were found in program practice of family planning (Table 6.11). This meant that recruitment patterns had to be reversed. Among scheduled castes 39 percent of those who had never used either traditional or modern methods of family planning had started using during the program, while 36 percent of other castes and 32 percent of Jat-Sikhs were new recruits. Similarly, shifts from traditional to modern methods of family planning were equalized.

Previous disparities by occupational groups were also reversed so that they became non-significant. For education the differentials were not completely eliminated but significance was reduced from p.005 to p.02. The differentials by age of wife remained highly significant but there was a shift in ranking of age groups with the youngest (<25 years) age group now having the largest percentage of new recruits rather than the fewest (Table 6.11).

c. What effect did integration have on equalizing disparities in use of various components of health services?

The dynamics of how the gross disparities in health were selectively influenced by various health interventions was shown best in selected output indicators of utilization. Measurements of coverage need to distinguish clearly between patient initiated activities for curative services and program initiated preventive and surveillance activities.

The use of curative activities was essentially equalized with the only significant differences in patterns of utilization being slightly more use of women's illness services in landowning families and where husbands were educated (Table 6.8). For children's services there was consistent but not significant slightly greater use of services by low caste and low income families. However, there was a distinct difference in the fact that high caste families continued to use private services while low caste families tended to shift largely to using project services (Figure 6.5). These differences in use of private services were marked in clinical care provided both to women and children.

Program-initiated preventive and surveillance activities demonstrated the capacity of the project to move beyond equality to achieve equity through preferential allocation based on need (Table 6.9). There were less than 10 percent of families who were not covered. For children's other services differentials were shifted in favor of low caste children ($p < .001$), low income families ($p < .01$), landless families ($p < .001$) and those with the least material possessions ($p < .01$). The differential in favor of more educated families still remained, however ($p < .05$). Women's other services which were primarily fertility surveillance covered the entire population of women by design, therefore, significant differences did not emerge except for low caste women ($p < .05$).

d. What associations with attitudinal factors were demonstrated which may help define target populations for specific service activities?

The attitudinal variables measured relate mainly to family planning but there were distinct differences in associations between these variables and health service utilization. An understanding of these associations may help in showing how services can be packaged to reach particular groups.

Womens' illness care was used most by those who approved of family planning and least by those who were uncertain, a pattern which occurred throughout this analysis showing that those who were uncertain were actually most negative (Table 3.3). People who said that less children die now than 30 years ago used women's services most. Women who talked with their husbands about family planning, presumably as an indication of relative liberation, also made more use of services.

With children's illness care a similar pattern was observed with the least use of services in families where they were uncertain about approval of family planning and where they thought more children die now than 30 years ago (Table 3.6).

Women's other services showed that essentially all differentials had been removed. The only significant difference was that for women under 35 in FPWS, 95 percent of the lowest caste women received care as compared with 87 percent of non-scheduled caste women (p. 3.13 - 3.15).

Other care for children under three also showed complete equity with over 90 percent coverage and no significant differentials. It seems evident that the use of children's services is almost universally acceptable regardless of initial attitudes or socioeconomic groupings and it is therefore a good way of gaining access to resistant families for health and family planning education (p. 3.19 - 3.20).

e. How was community support for equitable coverage achieved?

An important part of achieving equitable coverage was to get village leaders to agree that this was a high priority objective. Community participation grew naturally from a sense of partnership between the projects and the village leaders. The people in greatest need do not come spontaneously for care because of a long tradition of psychological, geographical and social barriers which make equal access a farce, even though services are supposed to be available and free. Active outreach is necessary to overcome this reluctance. A simplified information gathering system that reached every home showed where problems were and these findings helped leaders to understand the need for focussed services. We made effective use of village leaders in convincing reluctant families to cooperate in preventive services

once they understood the problem.

Surveillance will gain public cooperation only if it includes mechanisms for rapid response when needs are identified. When family planning entry points indicated that a couple was ready to initiate or change a family planning method the response was prompt. If complications were reported they were rapidly care for. If the regular monitoring of illness and growth indicated an early disease problem or a lack of weight gain there were established routines to provide appropriate interventions. Equity can be achieved most readily when efficiency and effectiveness are also maximized.

f. What proportion of coverage was provided by non-project services?

Detailed special surveys on health care included reporting from families of services received from non-project sources. During a two-week recall period illness was reported in 56 percent of children under 3, in 30 percent of children 3-15, in 50 percent of women and 27 percent of men (page 3.5). Out of these in experimental villages 50-60 percent of sick children received care as compared with 30-40 percent in villages with no project services. Women received care from all sources in the following percentages: controls 26 percent, FPED 35 percent, FPCC 38 percent, FPWS 47 percent, FPWSCC 42 percent. Of the men 40 percent received care from non-project sources. Where project services were available they provided about two-thirds of both women's and children's care. In each situation this reduced the other sources of care by about half. The other sources of care were provided by private and indigenous medical practitioners in more than 80 percent of the cases. (Table 3.2)

5. What was the experience relating to the potential of using a single-purpose family planning approach?

Even though preliminary review of our data suggested that concentrated family planning education and service (FPED group of villages) produced greater acceptance over the first one or two years of implementation than any other experimental group, more careful analysis shows that these impressions were misleading. The apparent rapid initial increase in acceptance and practice of family planning was demonstrated on more careful analysis to have been due largely to substitution to use of project sources of supply among people who were already prior users of family planning (Table 2.11). In FPED villages 71 percent of program users were prior users with two-thirds of these having used modern methods. In other groups 57-59 percent of program users had been prior users but only about one-third had used modern methods.

A further indication that the FPED impact was more apparent than real was in the balance of methods included among the modern methods at the end of the project. The final figures in FPED included 48 percent condom users in FPED as compared with 29 to 35 percent in other village groups (Table 2.3).

In explanation of these differences the most obvious reason is that a number of intrinsic village characteristics in FPED showed greater affluence and pregressiveness. Through unforeseen selection problems FPED villages happened to have (Table 1.1) the highest proportion of high caste people, the highest literacy, the lowest proportion of population under 15 years, the most landowning farmers, the highest tractore usage and the highest median total income per family. They also had been subjected to an intensive family planning campaign under the government services.

It is also important that the FPED villages were included in project services for only two years while other villages received services for three or four and a half years. The early termination of the project proved most damaging to definitive conclusions in that we never achieved obvious plateauing although fitting quadratic equations showed that in FPFed and FPCC the curves were leveling off. In the original experimental design the most important measure of impact was to have been the levels at which family planning practice curves plateaued in the various experimental groups. Because logistic, financial and political considerations made it necessary to phase in the study villages over several years it was decided to start with the most complex in terms of multiple services and therefore FPED was delayed.

A general impression was that not much more could have been achieved in FPED even if the project had continued. Village workers were saying that they had to have something more than family planning to talk about with village people. Efforts to start women's clubs and general welfare education were starting although such activities have no effective indigenous precedent in the highly family-oriented and factionalized Punjab villages. The problem of boredom of village workers and villagers themselves could probably not have been resolved simply by increasing the population to be covered because our functional analysis studies (FAP) had shown that impact would then have been diluted by the much greater time required for travel between villages. In summary, we feel that family planning practice in FPED was beginning to plateau in spite of numerous special advantages in these villages.

6. How genralizable were the research findings in view of the rapid economic growth and social change in the Punjab?

The fact that the Narangwal project was based in an area blessed by rapid socioeconomic development raises some question about the relevance of our findings to other parts of India and to other countries. The reality is that rapid development is now occurring in at least half of the states of India and in most developing countries. With the increasing pace of development in all areas, our results should be applicable to where other states will be even if they are not there now. The effects we demonstrated in less than four years are achievable elsewhere even if the time required to produce change might have to be extended. General principles derived from this analysis of interactions between service components of health and family planning services will, of course, require appropriate adaptation in local implementation. Our prediction is, however, that indices for project program impact derived from our data will be fairly representative of average conditions in most developing countries for the next two decades.

POP MONOGRAPH

CHAPTER 10

FIELD IMPLICATIONS OF THE NARANGWAL EXPERIENCE

Carl E. Taylor

To balance the quantitative data reported in the rest of this book, this final chapter presents some qualitative impressions reflecting the total experience of practical learning from living and working in the Narangwal villages during the period of this research. These insights contribute specifically to a general discussion of some practical implications to be considered in implementing integrated services. Personal judgement about how large scale implementation of the findings from this research might be carried out leads to generalizations about how field research projects such as Narangwal and the numerous others now functioning effectively in India can contribute to national program development. Some statements in this chapter are supported neither by data nor by references to other research since they represent opinions coming out of the field experience and because they identify issues that need to be studied further.

There can be no argument that if population policy and health policy can be made congruent rather than competitive, both will benefit. When this research started the separation of family planning from health services in many countries had led to open competition between the two hierarchies even though they were often ostensibly under one ministry as in India.

Since the Bucharest Conference on Population and the Alma Ata Conference on Primary Health Care most countries and international agencies (Salas UNFPA annual report) have now made the basic policy decision to integrate the delivery of services for health and family planning. There is also growing agreement that population planning and primary health care must be considered in the broader context of intersectoral development and local implementation must rely increasingly on finding ways to promote community participation and self-reliance. As delivery systems for services are integrated there will be continuing need to give special attention to the broad implications of population growth and means of coordinating policies involving several ministries; for this purpose many countries have found it desirable to set up a cabinet level population commission.

Review of Ways in Which Integration With Health Services Can Increase Family Planning Practice

In the introductory chapter, six potential mechanisms were presented as ways in which health services might increase family planning practice. Two of these are from the perspective of the health system and deal with factors that influence program effectiveness, efficiency and personnel attitudes. Typically arguments advanced in support of vertical programs have assumed that efforts focussed on only one objective would promote effectiveness and efficiency. We have shown, however, that integrated programs can be made more cost/effective and technically efficient than family planning alone. Our experience in the family planning education group of villages also showed that after two years of doing only family

planning our village workers became increasingly bored and were insisting on having something more to talk about with village women who were also becoming bored with repeated discussions of the same topic. Just expanding their geographic area of responsibility would not have reduced the monotony of their activities and would have reduced efficiency because they would have had to spend an inordinate amount of time travelling between villages as often happens in programs concentrating on family planning only (FAP bk).

Two mechanisms are from the perspective of the people being served and deal with ways in which integration can improve rapport and patterns of utilization. Our experience was that combined services make more sense to and are more convenient for the people because they deal with problems as seen in the village home. At Narangwal this was achieved by the active development and use of entry points since we refrained from just adding activities together but carefully worked out functional integration in naturally linked continuing services and sequencing to accommodate the convenience of families. The linking of services makes it possible to use the rapport created by a service such as maternity care, for which there is continuing demand, to improve the utilization of family planning and preventive services for which there is less spontaneous demand. The best evidence that we were able to achieve this kind of synergistic effect was the considerable success in equalizing coverage by getting both health and family planning to the previously underserved lower socioeconomic groups so that their levels of use became comparable to higher socioeconomic groups. The equitable use of family planning services seemed to be associated with reducing the discrimination in distribution of health services.

The final two justifications are based on the presumption that

fundamental changes in attitudes and beliefs can be encouraged by integration, especially in relationship to the child survival hypothesis. The available data indicate that findings were consistent with the postulated effects, but the conclusions were not as definitive as those on practical program linkages. It had been postulated from the beginning that the results that would be most quickly evident would be in direct program interactions and in the cost/effectiveness of the way services were organized. Next, would be factors related to patterns of utilization and the behavior of village people. Finally, we assumed that basic changes in attitudes and beliefs would take more than five years to demonstrate. Unfortunately, the project was terminated after only four and a half years of effective service interventions.

Framework for Implementing Integrated Services

Integrated services have been criticized for being vague and conceptually diffuse because they seem to promise everything. The greatest need in planning is to set priorities and focus limited resources in order to achieve maximum impact. From the field experience at Narangwal we evolved two approaches to provide a framework for focussing activities. The more general framework is a series of 8 steps which have been defined in developing integrated services. The more specific framework is a set of 14 entry points which were used to introduce family planning into health services routines.

1. Practical Steps in Developing Comprehensive Health Care

A sequence of eight steps was defined to guide the process of developing community based primary health care (Table 10.1). The first step is an intensive process of defining local needs using two distinct approaches. An essentially epidemiological approach which is used to

Table 10.1

SEQUENCE OF ORGANIZING INTEGRATED PRIMARY CARE
FOR HEALTH, POPULATION AND NUTRITION

1. Clear definition of priority problems in local community
 - a. Epidemiologically determined needs
 - b. Community demand (perceived need)
2. Selection of specific interventions that most cost/effectively meet problems.
3. Functional analysis
 - a. Role reallocation of tasks in health team delegating responsibility to the periphery including community workers
 - b. Shift activities as close to homes as possible.
4. Retraining and supportive supervision of all personnel
5. Design program of surveillance for equitable coverage and definition of high risk groups.
6. Management system for support and referral.
7. Balancing responsibility and authority between health system and community.
8. Monitoring and evaluation to evolve improved services.

identify health needs must concentrate mainly on those that are common, serious and preventable. This should be balanced by a parallel process of defining community demand so that priority setting is designed to meet local preferences in such a way as to educate the people about the need for attention to epidemiologically determined needs. This can be facilitated by involving community members in data gathering and interpretation so as to generate understanding of long term as compared with short term effects.

The second stage is to decide on the most appropriate interventions to solve the priority problems. The most appropriate innovations are those that are sufficiently simple, cheap, safe, and locally maintainable to be taken over by community health workers or family members. Again, judgement must be balanced between the less effective methods that can be carried out in the home as compared with more sophisticated methods requiring technical expertise.

A third step is to decide how far down in the health hierarchy the chosen interventions can be delegated. The basic criterion should be that anything that can be readily routinized can usually be delegated to the periphery if it is sufficiently common to justify the necessary training and logistic input. At the local level a package of perhaps half a dozen simple services can be chosen that fit together naturally according to what makes sense in the home and in accordance with how people view their problems. This role reallocation requires a clear specification in standing orders.

The fourth stage is intensive training or retraining to carry out the new package of tasks. It is also essential to establish a whole system of professional support mechanisms emphasizing supervision

that is educational rather than punitive.

The fifth step is to provide for routines of surveillance to monitor the total population to ensure complete coverage and preferential attention to those at greatest risk or with early problems. The sixth step is to provide an effective management system that will ensure regular availability of drugs, supplies, forms, transport, housing and salary payments. This support also should include provision for referral of problems that cannot be handled locally.

The seventh step is to go through a very delicate balancing of responsibility and authority between functions that will be carried out by the health system and those carried out by the community. The eighth step is to set up simple information reporting that leads back to problem definition, program evaluation and a return to the first step in a cyclic repetition of the process. The whole sequence should ensure prompt feedback to identify and resolve problems early and careful monitoring of coverage to ensure equity for those at most risk. In the sections that follow some of these issues are discussed in greater detail.

2. Use of Family Planning Entry Points in Routine MCH Services

A great deal of field effort at Narangwal went into working out entry points that build natural linkages between services into the daily routines of FHW's. Table 10.2 shows a listing of the 14 entry points for family planning services that were defined to guide FHW's. The initial list contained over 30 entry points but field testing made it possible to streamline them to those that seemed most effective. Such integrated functional work patterns were readily learned as part of the basic training of peripheral workers and the forms were designed to assist workers to remember routine inclusion of appropriate motivational messages. In our experience

it was much harder to add on this kind of integrated functional activity to auxiliaries who had been indoctrinated with the routines of a particular categorical system of work, but our evidence on this is anecdotal.

The Narangwal Experience in Adapting Services to Local Demand

In classical management theory the emphasis has been mostly on increasing efficiency through greater specialization. As the management objectives shift from constructing things to working with people and providing services, it has been necessary to find a different way of focussing activities. Rather than determining work load and distribution purely on the basis of efficiency in performing tasks equal attention has to be given to a two-way interaction with the people served. People resent being treated as things, as happens in the assembly line atmosphere of big hospitals. Local demand needs to be included in priority setting so that services are designed to suit the people's convenience instead of only being concerned about the convenience of health workers. Effectiveness, efficiency and equity can all be improved by focussing activities on particular segments of the population where the need is greatest and where several problems can be cared for at the same time. This simple principle has not been included in management thinking about health care but it is fundamental to thinking about integration.

In the sections that follow we have tried to present a balanced discussion on both supply and demand because we feel that focussing activities on particular families in need is just as important as increasing efficiency in the way tasks are performed. From the field experience we present some

Table 10.2

14 HEALTH SERVICE ENTRY POINTS FOR FAMILY PLANNING MOTIVATIONAL ACTIVITIES

1. During the routine fertility survey of non-pregnant menstruating eligible women.
2. At the time of confirmation of pregnancy.
3. If pregnancy ended in abortion, at the time of post-abortion care.
4. Approximately at the 36th week of pregnancy during the antenatal visit.
5. At the time of the 14th day postpartum and neonatal examination.
6. At the 6th week postpartum examination combined with the well-baby checkup.
7. During the 5th to 6th month after delivery before daughters of the village left their mother's home and when daughters-in-law returned from their maternal homes. This was combined with the well-baby check, immunization, and weighing of the child.
8. During the 7th month of lactation combined with the well-baby check.
9. During the 9th and 10th month of lactation combined with the well-baby check.
10. With all routine health checks of children under 3 years of age.
11. With the routine weighing of children under 3 years of age.
12. At the time dietary advice for a child was given.
13. Following completion of a child's basic immunizations.
14. Following identification or treatment of specific health problems including malnutrition, prematurity, anemia, congenital disease, accidents, and severe illness of children.

practical ways to increase effectiveness and efficiency on the supply side of the planning equation and also some specific considerations relating to the demand side by understanding and using factors that influence motivation for family planning.

Improving the Functioning of Integrated Services

Developing the Narangwal service inputs was a constantly evolving process of trying new approaches, quickly measuring their effect on field services, getting feedback from family health workers, supervisors and especially the village people and then modifying and adapting procedures. FHW's were encouraged to try out their own ideas about ways to solve field problems. Their presentations of their field experiences and problems at the biweekly training sessions was a great learning experience, especially for the professional staff. Most of the comments that follow come not from quantitative data but from practical field observations not only at Narangwal but also in service programs in several countries.

1. Process of Selecting a Limited Range of Activities to be Emphasized in Integrated Services

Efficiency in the provision of services should be based on appropriate delegation within the health team so that tasks are performed by the most peripheral worker who can safely meet priority needs. A balanced clustering of skills is essential. Beyond that, a general observation is that while most administrators agree that peripheral workers should be given only a limited range of tasks there is fundamental disagreement about how this package of activities should be selected. Vertical programs are developed by experts who select tasks within their professional discipline. Family planning experts choose a mix of methods which vary tremendously in mode and timing of use, expertise and facilities required, patterns of administration, target population and educational support. Or a group of infectious disease

specialists setting up an immunization program similarly select vaccines that vary in target age group, timing, cold chain requirements, route of administration and expertise needed.

In comprehensive integrated services, however, the process of selecting the limited number of priority activities for the peripheral workers should be completely different. Rather than choosing the cluster of tasks primarily on the basis of what makes sense within a professional discipline the choice should grow naturally out of what makes sense in the village home and local ecology. Priorities should be set by balancing professionally determined definition of need against community decision about expressed demand. Community felt need for a minimum of medical care for mothers and children should be met in a way that encourages families to solve these problems themselves while learning about the long term potentials of family planning and health promotional activities of which they had previously not been aware. The natural entry points that have been defined in this research provide an effective means of ensuring attention to family planning.

The whole concept of priority setting means that special emphases will be promoted in integrated services for specified periods of time and not that everything will be attempted at the same time. This should be done, however, within the general health infrastructure and by a single group of workers who recognize that even though they may focus for a period on a limited area their responsibilities are general. They are then prepared from the beginning to move on to other responsibilities rather than resenting added responsibilities as categorical workers typically do.

2. Avoiding Overloading of Peripheral Workers with Curative Activities

Day to day work in the villages provided much evidence that the greatest danger in an integrated program is overloading of peripheral workers. Most official job descriptions have been developed by committees which invariably attempt to be comprehensive and therefore include everything that anyone can think of. In order to generate agreement and minimize fears that the peripheral workers will become quacks, the wording is often deliberately vague and focussed on preventive hopes rather than realistic roles. When the tasks assigned become unreasonable, workers simply focus on what they are most comfortable doing or whatever brings them immediate rewards. They set their own priorities rather than working in accordance with planned priorities.

The only way to work out a balanced load of responsibility is in the field. The adaptation to local health problems, cultural constraints, travel arrangements and rapport requirements has to be worked out in a setting where direct feedback from the workers can be evaluated and flexible modifications evolved.

Invariably, peripheral workers will behave just like doctors in getting their greatest gratification from curative work because of the immediate rewards that come from seeing patients get well. Left to themselves, all health workers can keep very busy treating patients even if they have only a limited supply of medications. The experience at Narangwal demonstrated the critical need for maintaining a total system of support and stimulation from the health system in order to maintain the planned balance of activities.

3. Simplified, Practical Field Training

An activity that proved especially conducive to innovation at Narangwal was the development of training programs for field workers. We maintained a constant flow of training in the project as FHW's married and moved on to other jobs. Since we were starting with individuals who already had two years of training beyond high school as auxiliary nurse midwives, we had a special opportunity to focus on practical field training. A strong impression was that fresh graduates did better than somewhat older women with experience in government services because they had less to unlearn in undertaking the new patterns of work.

At first our training programs were based on the notion that training FHW's to follow routine standing orders would have to be simple and designed to produce essentially reflexive responses. We emphasized repetition until routines were memorized. This type of training took up to six months. Then we undertook progressive field experimentation to streamline the process and eventually were doing the entire training in six to eight weeks and getting far better results.

The basic innovation was to recognise with appropriate humility that our workers could become intelligent problem solvers. We developed training modules that were completely practice-oriented. One week blocks of academic work alternated with field preceptorship periods during which they lived and worked with an FHW who served as a role model. An initial week of academic training was devoted entirely to telling new recruits what their tasks and responsibilities were going to be. Then they spent a week in a field preceptorship observing what their tasks really were. When they came back for a second week of academic work there was little need to repeat

anything. Their minds were full of questions and they usually needed to have their questions answered just once. They were taught how to carry out the special skills they were to practice. The next week of field work provided an opportunity for them to try out the things they had learned. Another round of academic learning concentrated on explaining why the selected procedures worked and the theory behind their responsibilities. The final round of field work produced a high level of competence.

One of the most satisfying aspects of this pattern of learning was to see how quickly they picked up appropriate attitudes and values. They learned how to relate with and generate cooperation among village people by observing what worked for their preceptor. It was especially gratifying to see how quickly they developed self-confidence and assurance so that rather than approaching males with a purely submissive posture they would speak openly and frankly with their colleagues and village leaders.

4. Supportive Supervision

Training did not stop at the end of the formal training period. Regular supervision was designed as continuing education specifically to promote constant growth in skills, understanding, capability to work with village families and understanding of their own limitations so they knew when to call for help and referral. We constantly told FHW's that they were the most important people in the project since they could tell professionals more about what was really going on and what worked in the villages than our data would ever tell us. A basic slogan built into all supervisory activities was that after every supervisory visit three things should have happened: the FHW should be better able to meet her responsibilities, the FHW should

have more self-respect and confidence in what she should or should not do; and the prestige of the FHW should be higher in the eyes of village people. The greatest problem was with doctors who liked to take over when they went to a village and viewed supervision as being primarily for the purpose of hammering down the ego of FHW's to keep them from getting an exaggerated idea of their ability. This punitive approach made doctors think of supervision mainly as policing and we had some difficulty establishing the principle that this attitude was directly contrary to our educational emphasis. We encouraged FHW's to expand their learning and responsibility as they showed capability. In the subcenters there were two shelves, one for the doctor's drugs and one for those of the FHW. Over time, more and more drugs moved from the doctor's shelf to that of the FHW. We emphasized that the ultimate indication that supervision was working effectively was when a village person would turn to the FHW and ask, if it was alright to do what the doctor had suggested.

An especially difficult situation occurs when peripheral workers are made responsible to two or more sets of supervisors from the health services, as well as the community. The field worker learns quickly to shift responsibilities among the supervisors in an unmanageable way. We inadvertently created this situation in our FPCC group of villages when we had a pediatrician supervise child care and a family planning doctor in charge of family planning. Supervision was fragments and as a result not only was family planning practiced least in this group of village compared with the other health service villages but also it was evident that FHW's did not derive satisfaction from or pay much attention to their work in family planning. They provided only 35 percent of the family planning contacts in FPCC as compared

with up to twice that proportion in other villages. This situation was further aggravated by the fact that the child care services started well before family planning and we found out the hard way the difficulties of adding a second set of services in sequential integration. It is also possible that some of these difficulties could be because it may be intrinsically more difficult to integrate family planning into child care when it is provided apart from women's services.

A continuing dilemma is how to use specialists from particular disciplines so as to make the best use of their expertise and focussed advice. In order to ensure that a particular emphasis is not forgotten, such experts can be made responsible for monitoring their kind of special activity so that they can then feed back their suggestions through field supervisors. The direct supervision and support of peripheral workers, however, must be through a single person in order to maintain balanced implementation of priorities. Specialists promoting one area of priority should not be given separate control and financing for specific activities because this will inevitably create confusion and conflict if they try to work through the same set of peripheral workers.

5. Continuity and Functional Relevance in Management Methods

The logistic back-up for services proved among the most critical requirements for making services work. In the whole system of primary care there are many points at which the whole activity can be stopped for lack of a single item. A sort of all-or-none law prevails with a great need for constant checking of many functional operations of which only a few of the most critical can be mentioned here.

In regular provision of drugs and supplies, probably the most common failing of public systems and also one of the most frustrating. Under the pretense of promising free medical care politicians have promoted a tremendous deception of the poor because these free drugs are actually never continuously available. One obvious difference between most private and public systems is in the capacity to manage the logistics of drug supply. Drugs are one thing people are glad to pay for because then they have some assurance that they will get what they think they are buying. We provided free medicines but insisted on identifying a limited range of the least expensive generic preparations that would be always available. Throughout the project, however, we were aware that getting the public to take over the cost of drugs would have been the easiest and best means of generating community participation in meeting the somewhat higher costs of our services.

Transportation is perhaps next most commonly a problem. Rural primary care depends on adequate transport. All FHWs had to learn to ride a bicycle. We developed a system of having each person buy a project supplied bicycle, using the bicycle allowance that we provided as payment so that in two years the bicycle was theirs. Supervision required Jeeps, motorcycles or scooters and travel arrangements had to be reliable and consistent.

Third in importance was providing secure housing for our women workers. The best arrangement was to have a respected village family provide appropriate rooms which were fixed up to meet basic requirements including screening, water, sanitation, etc. at project expense. This was infinitely more secure than building separate housing. The greatest breakthrough in the safety of the FHW's came as a result of a suggestion by panchayat members themselves.

The general arrangement that proved highly effective was that the panchayat announced to the village that they were "formally" adopting the FHW as a daughter of the village so that if anything happened to her the social consequence would be the same as if it were the daughter of a panchayat member. Almost no problems ensued and all relations were remarkably congenial.

6. Achieving Coverage Through Surveillance

Our efforts to balance effectiveness and efficiency in designing services that achieved equitable coverage were based mostly on surveillance. The fundamental approach was to monitor total populations using simple indices that provided early warning of a specific health need. The surveillance system included rapid response mechanisms so that problems that were identified early could be treated promptly and their extension limited. Two forms of surveillance were used.

Community surveillance gave information about prevalence patterns in villages and in specific groups. This provided early warning of the spread of infections and helped to define seasonal and group distributions. An example was the demonstration among low caste families who had to work long hours during harvest in the hot season that diarrhea, dehydration and marasmus were causing particularly high morbidity and mortality. This led to community control measures such as day care centers.

Individual surveillance was equally important in that monitoring particular indices ensured total coverage of health needs. It was both less expensive and more cost/effective to monitor everyone and then provide care only for those in need than to try to cover everyone with mass care. The most straightforward example was growth surveillance to focus nutrition

supplementation on children whose weight and height gain was faltering.

The whole family planning program was based on surveillance of eligible couples. Regular contact with every couple through the fertility survey required only a few simple questions and a consistent recording system. The fact that this was the mother's most direct access to simple curative care made the rest of the preventive activities and family planning highly acceptable and a useful channel of education. The family planning entry points and risk classifications of pregnant women fitted naturally into a simplified decision making process for FHW's.

7. Balancing Community Involvement and Controls on Equitable Distribution

In addition to its greater effectiveness and efficiency, integration is justified by the fact that it fits better with the new primary health care (Alma Ata) orientation of promoting community participation. A focussed approach to health planning is needed which combines centralized top-down approaches with decentralized bottom-up flexibility. Vertical programs are by their very nature committed to a tight hierarchical framework in which efforts to get community cooperation are designed mainly to manipulate the people so they will go along with decisions that are imposed from above. The presumed efficiency of vertical programs depends on focussing on a limited set of activities but the prescribed package gives the people at the periphery no choice but either to go along with or reject the services offered. There is an intrinsic incompatibility between vertical programs and true community participation.

Integrated programs have the more complex problem of adjusting a limited but flexible package of service options to local needs. The new emphasis on self-reliance presents the opportunity to promote progressive peripheralization of services to help people to do more and more for themselves. The best examples of this in our experience at Narangwal were the dramatic changes that occurred when: mothers took over oral rehydration for diarrhea, when families took pride in meeting nutritional needs of a child rather than using the feeding center, and when panchayats collected food at harvest time from farmers to be stores for use as needed in the feeding centers.

One of the continuing concerns in turning decisions over to the community is that local leaders tend to appropriate the benefits of services for themselves, their families and friends. To by-pass traditional local patterns of exploitation of the poor has been a serious dilemma in trying to ensure both equitable distribution and community participation. A simple system which works well is to get community leaders sufficiently involved in defining the distribution of problems so that they see the need for equity. At Narangwal we relied mostly on personal contact to enlist the involvement of panchayat members in persuading everyone that they should participate in the care program. In mass programs where such individual attention is difficult, the surveillance system must have built in accurate mechanisms for measuring and reporting coverage. Supervisors must be alert to situations where coverage is incomplete or where problems are defined but no care is provided. If the service can continuously focus on actual health needs then the poor will reap an equitable share of the

benefits.

The most effective means to ensure continuing attention to equity is to have an independent team sampling key indices throughout the health system. This keeps the routine service reporting honest. The findings from the overall reporting of coverage can lead into a system of rewards for the community and recognition for the leaders if the data show that equitable, effective and efficient community involvement in their own health care is occurring.

Finally, an excellent means of making sure that services meet the needs of the whole community is to get the people themselves to collect data for routine surveillance. Considerable accuracy in household surveys can be achieved but the format must be simple enough to fit local conditions and culture.

Understanding and Using Factors that Influence Motivation for Family Planning

The next sections discuss specific variables relating to demand that seemed to have direct impact on family planning motivation and need to be specifically recognized as constraints or useful adjuncts when planning integrated services.

1. Improvement in Morbidity as a Means of Changing Attitudes

Although we were not able to measure the relationship directly we have the strong impressions that the impact of recovery from morbidity on family planning attitudes may have been more important than the reduction of mortality which was a major focus of our research. Among village people deaths have long been accepted fatalistically and in any case prevention

of deaths is not easily demonstrated except statistically. Recovery from an illness is an emotional experience that seemed to contribute importantly to attitudes about change and development generally. Repeatedly we experienced situations in which recovery from a health problem which could have previously been considered hopeless produced a significant change in fatalistic attitudes and a general openness to new ideas. This was especially evident if causation had been thought to be supernatural.

For instance, in local terminology, third degree marasmus is known as "sokha" which means drying up. When the local Syana or faith healer pronounced the diagnosis of sokha it was accepted as a prediction of death. The causation was said to be intrusion of a "parchawan" or evil shadow and the child was supposed to be kept in a dark room. By demonstrating rapid recovery from marasmus, especially under home conditions, we observed repeatedly that attitudes toward a whole range of social change parameters were modified in that part of the village.

Similarly, a major problem in promoting oral rehydration was the common belief that giving fluids would aggravate diarrhea. The belief has substance in the fact that a good way of stopping diarrhea is to permit dehydration to become so severe that the body has little fluids left to lose. To demonstrate that giving fluids saves life even if the frequency of watery stools may increase temporarily, we at first had family health workers stay in the homes giving the oral fluids to dehydrated children themselves until hydration improved. It only took a few such demonstrations in a village to get mothers to start oral fluids themselves when diarrhea occurred rather than waiting for the FHW. Diarrhea deaths then dropped 50 percent in one year and this

was dramatic enough to be evident even to the village people because diarrhea had been responsible for almost half of all deaths of children. But the factor that seemed to change attitudes most directly was a mother's experience of having something practical and simple that she could do herself as she watched her child recover from severe dehydration.

Beliefs seem to change in clusters of related ideas. Part of the challenge is to find those attitudes in a culture that can be most naturally linked with motivational factors important in child bearing and fertility. In addition to beliefs about child morbidity we began to identify interesting relationships with specific female diseases that need to be studied more intensively. All across the Indian subcontinent the health problem that seems to cause village women most worry is leucorrhea or continuing vaginal discharge (Refs: Sri Lanka, Carstairs). Doctors typically shrug off these complaints because to them they seem minor, unimportant, undiagnosable, and not worth treating. As with chronic urethral discharge in men, the cultural derivation seems to be related to ancient Vedic belief, in which 40 drops of blood form one drop of fat and 40 drops of fat form one drop of semen, making the latter the most precious fluid in the body. Because loss of semen is considered weakening, Indian athletes refrain from sexual intercourse prior to competition. Both for men and women, a chronic discharge from the genitals is thought to represent a continuing loss of a fluid like semen and therefore the most important life forces. They cannot understand why doctors are so ignorant as to treat these problems lightly. In our clinical work we took their concerns seriously and in providing treatment carefully tried to introduce the educational message that too many pregnancies were an even greater drain on health for both mothers and children than leucorrhea

and that leucorrhea often followed cervical damage at childbirth.

These examples are mentioned to illustrate the probability that the impact of health services was not just through improved mortality but that changes in morbidity probably affected motivation even more directly. On a practical programmatic level then it seems especially worthwhile to define local culturally relevant linkages between morbidity and family planning.

2. The Influence of Son Preference on Family Size Norms

In the Punjab son preference is obviously a dominant motivational influence. Survey data were definite and consistent in showing that families want two sons and one daughter. This was not a vague expression of desire but it was consistent and widely pervasive. The demographic problem is that in order to have two sons parents have to have an average of four to five children. In the past the extremely high differential mortality of girls (63 percent of deaths in children 1-3 years were girls), meant that net results of survival approached the desired balance.

Having one daughter is considered a social duty but after that dowry and other costs with few compensating economic benefits make the disutility of additional daughters a serious economic and social burden. Sons are perceived as a continuing source of economic benefit and their contributions start in childhood as they look after cattle and many other farm chores. A rather refined calculus of balancing incoming dowries for son against outgoing dowries for daughters dominates the economic planning of families in spite of official measures against dowries. Equally important are long-standing social forces. Families in villages gain prestige and strength largely through sons. A mother achieves social standing only as she becomes

a mother-in-law and her future support and security depends on sons. Cremation rites for fathers require a son for successful transmigration.

The impact of child survival in the Punjab then should be measured against the demand for sons which greatly complicates achieving the two child family norm. The practical relevance is that an important influence in achieving a one son norm will be the clear demonstration that children are surviving.

3. Linking Child Care and Family Planning by Using a Redefinition of the Child Survival Hypothesis.

A major objective of the original research design was to conduct a field test of the child survival hypothesis. Our findings on that research objective have led us to a redefinition of the child survival hypothesis. Our results confirm the general experience that there is no simple evidence demonstrating a direct connection between child survival and fertility, when the relationships are studied as spontaneously occurring phenomena. Following up the general discussion of these issues in Chapter 1 we present the following general conclusions. Analysis of the "replacement" effect will require more refined calculations than we have been able to present here and seems to become important after couples are already limiting births and mortality has fallen to the point where there are not many deaths to replace. Our detailed analyses of replacement motivation are being published separately.

The "volitional insurance" effect seemed important to about 15 percent of couples at Narangwal. It seemed to be clear-cut but not sufficiently common as an overt attitude to have direct impact.

In our redefinition of the child survival hypothesis we postulated that the main mechanism by which it works is through a "subconscious insurance" effect. This will probably be manifest only after a significant lag period as awareness that child survival has improved gradually permeates social expectations and influences the small family norm. The cross-sectional tabulations in Chapter 2 indicate that such subconscious associations are present. Of most practical importance was the demonstration of a significant statistical relationship between the belief that the probability of child mortality has decreased and acceptance of family planning.

To demonstrate conclusively that these associations are causal it would have been necessary to continue observations over a long enough period to show sequential time relationships and that particular patterns of attitudes resulted in specific behavior. We could measure attitude change only between cross-sectional surveys 1 and 2, or a period of approximately two years. The project was terminated just as we were starting the third cross-sectional survey. Similarly, the behavioral changes in family planning practice could be divided only into two periods of about two years each. From these data the only direct influence that we could demonstrate was that the impact of actual utilization of health services on family planning practice was strongest with concurrent use rather than prior use (Table 4.3). Use of health services equalized earlier differentials in beliefs about child survival but practice changed more consistently than beliefs (Table 5.3). It is our impression that the short period of observation did not permit time for consistent patterns of relationship between beliefs and practices to emerge.

The most important feature of our redefinition of the child survival hypothesis is that a dynamic and active effort deliberately to link family

planning with child care can move awareness of child survival to the conscious level of thinking so that it will be a strong and direct influence on family planning motivation. The regular use of family planning entry points when children recover from serious illness or are obviously growing normally can be used to convince parents that they do not need to have another child soon or ever. Social awareness of the eventual need for a smaller number of children than in the past may then be converted into a positive force for family planning by an educational effort which uses healthy children as audiovisual aids. Our total experience at Narangwal demonstrates that such an integrated service can be readily developed and should contribute to bringing both birth and death rates down together.

4. Phasing the Transition from Lactational Amenorrhea to Family Planning

Abundant evidence from many studies has demonstrated that the principal cause of shortened birth intervals following child death is the termination of lactational amenorrhea (Khanna Study and Preston). The protection provided by lactational amenorrhea has been considered a biological effect. Local cultural beliefs uniformly supported prolonged breast feeding partly because of the conviction that it has a strong contraceptive effect. This belief helped our nutrition education efforts which increased lactation by five months in nutrition villages as compared with control villages (NUT Mon.)

Since prolonged lactation is used consciously in the Punjab as one of the widely approved traditional family planning methods, the association between stopping lactation and spacing may in part be deliberate rather than incidental. Many village couples expressed the opinion that women really did not have to worry about contraception until they stopped lactation. Pregnancies occurred in the transition. In order to counter this belief, our FHW's collected examples of local women for whom late stages of lactation

had failed to prevent pregnancy. It became essential in linking beliefs in lactation to the start of family planning to develop careful routines of phasing in family planning using temporary methods that did not interfere with prolonged lactation.

5. Selecting Target Families with Both High Child Mortality and Short Birth Intervals

In Chapter 7 it was noted that duration of interbirth intervals was considerably shorter in those who used contraception (13-18 months) as compared with those who did not (19-24 months). This puzzling reversal of our expectations that greater spacing should have resulted from the family planning program seems to be related both to the deliberate effort to promote contraception after a birth and to the observation that short spacing was closely related to high child mortality. At least part of this effect was because the older child was displaced from the breast after pregnancy had occurred and perhaps the beliefs in lactational reduction of fecundability contributed to this kind of accidental pregnancy. Time pressure is particularly great for low caste and poor women who have to put in long hours of labor in the fields, especially during harvest. Our data showed a strong seasonal effect on child mortality which was highest during harvest probably because mothers in poor families had to work in the fields and leave their younger children in the care of older siblings who could not provide the usual food and care. If a woman were to become pregnant under these circumstances she would be even less likely than usual to go to the extra trouble of providing breast feeding for an infant in a high parity situation.

These high risk families with both high fertility and mortality were in any case a special target group for our integrated services since they

tended to be from the lower socioeconomic groups. Low caste families were equitably reached by the surveillance and monitoring approach developed at Narangwal. The results suggest that concentration of combined family planning and health services on those in greatest need has a good chance of focussing care on this high risk group of women who experience both high child mortality and high fertility.

6. Targetting Family Planning According to Socioeconomic Influences on Family Planning Motivation

Current thinking about family planning motivation has stressed variables such as women's education, women's employment outside of the home, changing the economic value of children through promoting their education, contact with urban centers and modernizing life styles (Ref: Ridker, Easterlin). In our regressions the strongest association with family planning practice by factors other than program inputs were with: spontaneous expressions of approval of family planning, whether women talked with husbands about family planning, age, parity, husband's education, and frequency of child death. The largely economic variables of income, land ownership and value of material possessions were much less directly associated with family planning practice. Women's education among married women was so low that there were not enough numbers for statistical analysis.

Except for education, most of the socioeconomic variables tend not to be readily manipulable and therefore they have little direct program relevance except as they can be used in targetting family planning activities. The whole process of community surveillance which has been defined uses these socioeconomic factors as criteria for judging risk groups and where family planning effort should be focussed.

Of some programmatic interest were responses to questions about communication between wives and husbands which proved to have strong association with family planning practice. We considered this to be an indication of relative social freedom among women and something that might be encouraged by education and by services. Improvement in women's role is, of course, a long term social objective in its own right and a major means of achieving that end is to relieve women of the unnecessary burden of bearing and caring for children who die.

Role of International Agencies

Although not a specific objective of this research, there are some clear lessons which emerged which suggest that changes in the role and priorities of international agencies are in order.

International agencies must take primary responsibility for having promoted single purpose family planning programs during the 1960's when concern about population growth stimulated massive funding. Left to themselves it is extremely doubtful if any governments would have separated family planning from health services. For donor agencies it seemed more important to have their funds focussed on sharply defined objectives within a framework of clearly defined accountability than to be concerned about overall development impact. There was an obsession to get quick results through simplistic search for easy solutions which could be transferred from one culture to another.

A more complex issue that needs to be recognized is that the main things that foreign aid has been providing are precisely those that village people take pride and satisfaction from doing for themselves. This

includes buildings for village health centers and subcenters, food and drugs. With current recognition of the need for building self reliance the whole pattern of technical assistance needs to be restructured. When the people are involved in providing facilities the buildings are more likely to fit local culture and ecology. Our FHW's were more secure when living in accomodations attached to a village family. Creating dependency on outside food is generally counterproductive. A special feature of drug use is that people trust the efficacy of a preparation most when they have paid for it personally and are therefore more likely to use it appropriately.

The Place of Special Projects in the Process of Implementation

Any field research makes a contribution to human welfare only if findings are carried through to practical implementation. From the beginning at Narangwal it was recognized that no package of services that could be developed would ever be implemented as a whole. Even though a great deal of effort went into trying to ensure that all interventions tested were inexpensive and simple enough for mass use, it was clear that there was no point in thinking that this kind of research would ever be replicated as a total package.

The impact of this research was more rapid than in most field projects because of healthy and continuing interchange with officials at all levels. Especially our periodic Narangwal conferences produced numerous examples of situations in which particular findings and observations were rapidly implemented in general services when they met special needs.

The findings on family health workers contributed, along with the other projects in India, to the thinking of policy groups such as the Srivastava Committee about the new roles for multipurpose and community health workers in the national service.

The long range pattern of implementation that we planned for at Narangwal was that findings from this research would need to be applied next in demonstration and training projects in various regions and states. In adapting procedures and methods the emphasis would then have to be even more directly on placing activities within the framework of regular services. Services could be streamlined and redistributed with community health workers taking on much of the responsibility that FHWs had been given at Narangwal. Performance levels in all projects should be pushed as high as possible through encouraging charismatic leadership and giving village workers a sense of special importance because they had a chance to help discover new ways of identifying and solving village problems and adapting technical methods. These regional demonstration and training centers should set a standard of performance toward which other services in the area could strive. Quality of care can be improved much more effectively by producing a contagion of caring and hard work that spreads from a project to the general services of the area than through either punitive measures or special incentives. In the five years since the Narangwal field work stopped we have been greatly encouraged that several dozen good demonstration projects have applied and expanded our findings.

This research has left us with a sense of optimism about the possibilities of providing both family planning and health care for village people. Methods are available which can accelerate the current decline in both fertility and mortality. They are feasible and cost/effective but will require realistic facing of the long hard task of implementing much of the rhetoric of recent years. Of special significance is the potential which was demonstrated at Narangwal that equitable distribution of the most needed services can reach the most deprived people in the villages

Appendix A

DATA COLLECTION METHODOLOGY

Cross-Sectional Surveys

1. Census and Socioeconomic

Demographic and socioeconomic data were collected in three censuses of the study villages in the years 1967-68, 1971-72 and 1973, and in two socioeconomic household surveys at the time of the first two censuses. Villages in the family planning education group (FPEd), however, were not included in the first round of either survey.

A team varying from 6 to 10 interviewers were responsible for these two types of surveys. Both young women and men with masters or bachelors degrees were recruited as interviewers and given intensive training in interviewing techniques and use of the interview schedules. They were supervised by one of the social scientists.

a. Census

The census was carried out after the study villages were carefully mapped and households numbered. During the census interview all families within each household were identified and all resident members recorded. To be considered a resident the member had to have been living in the village 6 months or expressed the intention to stay a total of 6 months or more. Special care was taken to enquire about members temporarily away, but who were normally residents of the village. Systematic probing to determine the age of each individual was standardized

using village events calendars containing Indian months and all major national and local historical events. Reinterviews and cross checks with other data sources showed that this method of determining age was quite reliable. Other information collected at the time of the censuses included marital status, education, occupation and dates of migration, marriage, births or deaths occurring between censuses.

b. Socioeconomic Survey

Multiple social, economic and other household data were collected in all households. Items in the survey included religion and caste, housing, sanitation, selected possessions including land, non-land income (labor, service, trade, etc.), and land (agricultural) income (available only on second survey).

Socioeconomic interviews were with the senior male member of the household, whenever possible, because of the need for accuracy in getting details of the type of crops, yield, and market prices which were used in estimating agricultural income.

2. Attitudes and Beliefs

Attitudes toward family planning, specific contraceptive methods, survival of children, and family size at the beginning of the project provided an important part of the baseline data collected. Change was measured by repetition of this cross-sectional survey after two years of services. In FPWSCC villages a third round was carried out at the end of the project. Because of the inclusion of FPEd villages midway through the project, only one round of cross-sectional surveys was available for this experimental group.

a. Development of Survey Forms

The widely recognized difficulty of measuring attitudes and beliefs led us to a cautious approach. There were no standard procedures that could be applied to the questions that we wanted to ask. We were especially conscious of the delicate nature of many of the important issues and the possibility of inadvertently antagonizing village people by questions such as those relating to the death of a son. In addition to long-standing cultural blocks we realized the need for special sensitivity to recent developments such as the backlash that had occurred in Punjab as a result of rumors about the hazards of the IUD.

This led to a sequential development of survey forms by our staff of Indian social scientists. The first stage was conceptualizing the questions to be asked. This was followed by an essentially anthropological exploration of the issues through in-depth discussions with a limited number of respondents. We then developed a structured format which went through several pre-test field trials. The form was mostly prestructured with only a few items permitting open-ended conditional responses related to reasons for particular opinions. A number of modifications were also made before the second round of surveys because of problems and gaps that had been encountered in the first survey.

b. Data Collection Team

The major responsibility for conducting this part of the research was assumed by the Indian social scientists on our staff. Six to eight field investigators were selected by newspaper advertisement

and interview. They were all young women and recent master's graduates in one of the social science fields--sociology, anthropology, geography, social work, etc. All were Punjabis, although only a few had come from a village background. Their field orientation included discussions of the conceptual and intellectual bases for the research. Forms were explained in great detail. They were given special orientation in interviewing methods for village workers using techniques such as role playing. Finally, as mentioned earlier, intensive field practice was under the direct supervision of the social scientist responsible.

c. Data Gathering

The data collection team went out as a group to villages. Each village had previously been carefully mapped and all houses had been given an identification number. A complete census had been done and each village resident was also given an identification number based on the house number. From the census, complete lists were drawn up of all women from 15 to 49 years of age. They were interviewed in their homes with the whole team of field investigators sweeping systematically through the village. During the attitudes and beliefs survey each investigator was expected to interview four families per day.

3. Knowledge and Practice

Information on knowledge and use of the various methods of family planning was obtained from all married women 15-49 years of age at the same time as the attitudes and beliefs data by the same survey team.

Questions about methods of contraception were categorized into five levels: (1) never heard about the family planning method specified;

(2) heard about the method but did not know how to use; (3) knew how to use the method but never used it; (4) used the method earlier but not currently using; and (5) currently using the method.

4. Pregnancy History and Present Fertility

The same team of social scientists and interviewers who carried out the attitudes, beliefs, knowledge and practice surveys also were involved in interviewing all married women 15-49 years of age regarding their pregnancy history. This was done in conjunction with the other cross-sectional surveys either on the same visit or close to the other interviews. Details about all pregnancies, pregnancy outcomes and infant and child deaths were obtained including dates for each event so that pregnancy intervals could be obtained. Additional information about the woman's current pregnancy status, age at marriage, age at cohabitation (maklaw), presence or absence of husband, breastfeeding practices and delivery practices was obtained.

Longitudinal Data Collection

1. Family Planning Practice

Of the 26 villages covered by the Narangwal study, 11 never received family planning services; while in 15, services were provided but they were started at different points in time. During the period of program operation, continuing information on contraceptive practices was obtained in all 15 service villages. This was accomplished through a system of service records, special registers and monthly reports maintained by the village level workers (FHW, FPE, FPW) and their supervisors.

The information recorded included methods used, dates of use and reasons for changing methods or discontinuing use.

2. Longitudinal Fertility Survey

All married women between the ages of 15-49 years were visited routinely every other month in their homes by FHWS to ascertain their current fertility status. On each such visit dates of the last menstrual period, confirmation of early pregnancy when appropriate, lactational status and family planning status were recorded on a special service record that was maintained for each woman.

3. Vital Statistics

Data on births, deaths and marriages were obtained in a continuous fashion from 1969 through 1973 from the following three primary sources:

a. Chowkidar: The chowkidar is a village resident employed by the government as the only source of vital statistics under the official registration system. He has multiple responsibilities related to his title, "watchman," and is often illiterate. During the period of our study the chowkidar continued to record all births and deaths which took place in the study villages. These records, however, did not contain information on births or deaths to residents of the village which took place outside the villages (i.e., the "outgoing" events).

b. Vital Statistics Investigator (VSI): The VSI was employed by the project to visit each village once in fifteen days and to contact about twelve key persons (informants) such as barber, shopkeeper, or village midwife, who informed him of births, deaths and marriages, both incoming and outgoing, which took place in the village and to villagers outside their village. The VSI then

confirmed the information from members of the family. He was a college graduate, and covered two groups of villages or about 10,000 population, travelling by bicycle.

c. Family Health Worker: The FHW was employed by the project with primary responsibility for delivering health and family planning services. The FHW gathered information on births and deaths during her routine home visiting and longitudinal surveys, and especially as part of the fertility survey mentioned above. Since no services were offered in the control group, no FHW was available to gather vital statistics data in these villages. Moreover, in villages receiving only family planning education (FPEd) the duties of the workers employed by the project did not include the same intensive case-finding and follow-up of pregnant women which were the responsibility of the FHW in connection with the delivery of maternal and child care services. Thus the coverage for data collection by the worker in the FPEd group may have been less complete than that of the FHW in the villages receiving health services.

In addition to the above methods of continuous data collection, births were also recorded in the cross-sectional surveys already mentioned--the pregnancy history and the population census. Finally before the end of the project in May 1974, a special vital statistics retrospective survey was conducted to validate information on all births and deaths which had occurred since 1970. Except for some differences in timing of the pregnancy history and census surveys these sources were essentially comparable for all the groups of villages.

4. Morbidity Survey of Children

In all of the villages associated with the parallel nutrition study a morbidity survey was conducted weekly by the resident FHW for each child up to three years of age. Based on the mother's recall, a detailed record was obtained of both the incidence and the duration during the preceding six days as well as the day of interview. Local terms were used in a standardized format to define illnesses according to a list of 44 clinical signs and symptoms. This history was supplemented by a physical examination performed by the FHW which obviously had to be limited to the day of the visit. For children who had been outside the village for more than 14 days, recall data were collected for the preceding two weeks.

5. Anthropometric Measurement of Children

Anthropometric measurements (weight and height) were recorded in all the ten villages of the nutrition project and in the four child service villages of the population study (FPWSCC). These measurements were made by FHWs at birth when possible and then at intervals conforming to the decelerating rate of growth of children over the first three years of life so that in each time period there would be an expected average weight increment of 250 grams. Measurements were scheduled once every month for the first nine months, once every two months between 9 and 21 months, and once every three months between 21 and 36 months of life. Measurements were taken on the day of the month corresponding to the birthday, plus or minus five days.

Service Input Information

Methods used to measure service inputs had been developed earlier in the functional analysis project conducted at Narangwal and other sites (FAP Ref.). Four separate data collection techniques were used by a special team consisting of field investigators with social science backgrounds, a statistician, and a physician.

1. Work Sampling--This technique provided detailed information on the time spent by project staff during their village work. Investigators observed all categories of staff who provided services on specified sample days recording the functions and activities performed at two-minute intervals throughout the observation day. Each service staff member was observed on at least 24 complete days during 1971 and on four to six complete days during the final five months of the project in 1973-74.

2. Service Record Analysis--Information was abstracted from individual service records for all years of the project (1969-1974). This information included a description and count of all project services received by individuals within the study population.

3. Sample Household Survey--Approximately 20 percent of study households in early 1973 and 10 percent of study households in early 1974 were interviewed in a special survey to determine their use of services, especially those available from sources other than the project (e.g., private practitioners, traditional healers, or government services) and all out-of-pocket expenditures related to this use.

4. Cost Analysis--Detailed accounting of all costs related to the provision of services for each year of the project was carried out. Using work sampling data and other information these costs were allocated to specific activities and services in order to calculate costs per unit of service, per capita cost for specific services, and cost/effectiveness ratios.

Appendix B

DESCRIPTION OF SERVICES PROVIDED IN THE NARANGWAL POPULATION STUDY

A major goal of the Narangwal effort was to develop an effective service model combining health and family planning for subsequent wider application following appropriate adaptation to new settings.

1. During the initial stages of the project certain crucial decisions were made about the framework of the services. These were: (1) to use the existing regionalized pattern in India to facilitate implementation of the results of the study; (2) to concentrate on the prospect for bridging the gap between the health services and people's homes in the primary care interface; (3) to focus on providing family planning and health services for women and children, and to provide only limited services to men; and (4) to refrain from including in the integration effort mass programs such as malaria control or other services covered by national programs which continued in parallel in our study villages. Integration of all basic health services at the village level was considered a more appropriate activity for subsequent demonstration projects.

2. The reasons for assigning high priority to services for women and children included:

a. The official Indian government policy to integrate maternal and child care services with family planning making this issue particularly urgent. It seemed that a natural relationship could be established combining maternal and child health programs and family planning.

b. The greater mobility of adult males made it possible for them to leave their villages to seek medical aid in primary health centers or elsewhere.

c. The likelihood that allocation of scarce resources to intensive home contacts concentrated on the approximately 40 percent of the village population who are children and the 20 percent who are women of reproductive age would produce the greatest impact on health status and fertility. Further focussing of effort was possible by selecting out high risk individuals within these groups.

d. The research objectives were to test specific hypotheses related to the health of mothers and children.

3. The services were organized according to the following underlying principles:

a. As much responsibility as possible would be delegated to those with minimum training consistent with good care, especially the family health worker (FHW), the indigenous midwife, village attendants, and the families themselves.

b. Medical diagnosis and care would be moved as far as possible to the periphery in the service system and in a setting appropriate to the village environment. An essential aspect of this was to have FHWs live in the villages where they worked.

c. The service would provide good communications and medical back-up for referral.

d. Rather than waiting for serious illness to develop, preventive services, early diagnosis and care, and home contacts would be emphasized.

e. A major investment would be made to get complete coverage through surveillance rather than trying to get compliance with mass procedures for control. For instance, weighing and measuring of children would be done regularly to identify faltering growth and then nutritional supplementation would be focussed on those in need. Similarly, intensive prenatal screening for high risk pregnancies would provide a basis for identifying high risk cases so that normal deliveries could continue to be handled by dais (indigenous midwives).

f. Supervisory checks and support would be routine to maintain worker motivation and quality of services.

g. Particularly important would be continuing education of all members of the health team through regularly scheduled in-service training programs and the development of field manuals.

h. Community participation in planning and implementing the services would be encouraged.

The process of developing the services was evolutionary and followed the general cycle of starting from the simple, then being willing to test multiple alternatives using complex procedures of research when they were appropriate, and then returning to the simple in streamlining for implementation. During the early stages of the project as the services were evolving, new components and programs were added gradually, enlarging the scope and complexity of the services. About midway through the project a conscious effort was made to begin to trim away unnecessary parts of the services with the ultimate goal of arriving at a simple model in line with realistic cost and manpower constraints. This process was still in progress at the termination of the project.

This evolutionary process made it impossible to plan and implement all the experimental service inputs at the same time. The children's services were evolved, tried out and applied first, followed by women's services and family planning. Table I.B.1 lists the approximate starting dates for all the major service components, by village and experimental group. These dates refer to the point in time at which the preliminary development of the initial service packages was considered far enough along to have relatively complete services in the villages. However, the services continued to evolve after these dates.

1. Children's Services

Children under 3 years of age bear the brunt of mortality, morbidity and malnutrition in rural Punjab and in most areas of India. This includes the neonate whose immediate well being may be determined by the health and nutrition of the expectant mother. The child care program provided intensive care to children 0 to 3 years of age, and episodic coverage of children 3 to 15 years old. Intensive care included routine health and development surveillance, immunizations, nutritional supplementation and curative care. Episodic coverage for older children was primarily curative services in subcenter clinics at the initiative of the family when the child was ill.

Table I.B.1

EFFECTIVE STARTING DATES OF THE MAJOR SERVICE COMPONENTS
IN EACH OF THE STUDY VILLAGES AND EXPERIMENTAL GROUPS

I.	<u>FPWSCC</u>	Children's	Women's	Family
		<u>Services</u>	<u>Services</u>	<u>Planning</u>
	1. Ballawal	Sept. 1968*	Jan. 1969*	Sept. 1969*
	2. Chaminda	Sept. 1968*	Mar. 1969*	Sept. 1969*
	3. Dhaipee	Sept. 1968	Feb. 1969*	Sept. 1969*
	4. Dolon Kalan	Mar. 1969	Oct. 1969	Oct. 1969
II.	<u>FPWS</u>			
	1. Sekha	-	Feb. 1969*	Sept. 1969*
	2. Uksi-Dudhal	-	Apr. 1969*	Sept. 1969*
	3. Chomon	-	May 1969	Sept. 1969*
	4. Kishanpura	-	Mar. 1970	Mar. 1970
III.	<u>FPCC</u>			
	1. Mansuran	Sept. 1968*	-	Dec. 1970
	2. Rattan	Sept. 1968*	-	Dec. 1970
	3. Saya	Sept. 1968	-	Dec. 1970
IV.	<u>FPED</u>			
	1. Rajoana Kalan	-	-	June 1972
	2. Rajoana Khurd	-	-	June 1972
	3. Barmi	-	-	June 1972
	4. Littar	-	-	June 1972

* Villages in which preliminary development of the different service components had been worked out and tried prior to this date.

During the course of the project as data from ongoing surveys were analyzed, a pattern for defining a "high risk" child was evolved. This knowledge was used to teach FHWs to identify these children and maintain closer surveillance over them than they did for other children. The characteristics predisposing to "high risk" were:

- low socio-economic status of the family,
- low birth weight or prematurity,
- a female child especially when there were more than one in the family,
- age range between 8 and 18 months, and
- a high birth order

The components of children's services which varied between villages according to the experimental design were as follows:

a. Prenatal Care - Tetanus immunizations, iron tablets, and folic acid were provided to pregnant mothers as an integral component of child care. Underweight, poorly nourished mothers received supplemental feedings.

b. Neonatal Care - The newborn was checked and weighed by the family health worker (FHW) as soon after birth as feasible. Repeat visits at 24 hours, 2, 6, 9, 14 and 40 days postnatally were made on the same schedule as for postpartum care. All neonates with problems or those weighing less than 2500 grams were referred to the physician for evaluation.

c. Routine Care - 0 to 3 years of age:

1) The underlying principle for the whole health program was surveillance in the sense that much effort was devoted to screening for morbidity and growth faltering. Then care could be provided early and in a highly focussed pattern. Each child was checked at home in a systematic sequence. This involved a history and review of symptoms, examination of the child, and checking for psychomotor development milestones. Health education was given to the mother as needed. These visits were more frequent during the first year of life and then

gradually decreased to quarterly visits in the third year. No routine checks were made after 36 months of age unless there was a specific problem to follow up.

In the FP-WS CC villages

visits during infancy were every month but midway through the study this was changed to seven visits spaced after the last postnatal visit. (See Table I.B.2 for the timing of these visits, their content and relation to women's services). In the FP CC villages, however, a weekly morbidity survey was part of the data collection for the parallel nutrition and infection study and this took the place of the health check. During the final year of the study, after the nutrition project was completed in May 1973, the frequency of visits in these villages was reduced to a biweekly visit during the first year of life and then according to the pattern of the FP-WS CC villages for children over one year.

2) Surveillance was also the rationale for regularly measuring weight and height as a health and nutrition monitoring device. Children were weighed and measured as part of the health check. Mothers of older children were encouraged to bring them to the clinic for their measurements. Children who had been identified as faltering below the expected growth curves and especially if they fell into any of the three degrees of malnutrition* were referred to the physician and started on

*Weight for age charts based on those developed by Dr. David Morley were used for each child to monitor growth. Curves were printed on weight charts indicating the ranges for malnutrition as follows:

1st degree--between 70 and 60 percent of the 50th percentile of the Harvard Standard Weight for age (HS-50)

2nd degree--between 60 and 50 percent of HS-50

3rd degree--below 50 percent of HS-50

By plotting the child's weight at each visit on this chart it was easy to identify whether a child was attaining the expected increments in weight for his age as well as whether he was in one of the malnourished groups.

Table I.P.2

COORDINATION OF ROUTINE CHILDREN'S AND WOMEN'S SERVICES
AFTER THE NEONATAL PERIOD

CHILD'S AGE (Months)	CHILDREN'S SERVICES					WOMEN'S SERVICES	
	Health Check	Weight	Diet Survey and Advice	Immuni- zation	Milestones	Fertility Check	Post- natal
1½	x	x	x	-	-	-	x
3rd	x	x	x	-	x	x	
5th	x	x	x	x	-	x	
6th	-	-	-	x	-	-	
7th	x	x	x	x	x	x	
8th	-	-	-	x	-	-	
9th	x	x	x	-	-	x	
11th	x	x	x	-	-	x	
13th	x	x	x	-	x	x	
15th	x	x	x	-	x	x	
17th	x	x	x	-	-	x	
19th	-	-	-	x	-	x	
21st	x	x	x	-	-	x	
23rd	-	-	-	-	-	x	
25th	x	x	x	-	-	x	
27th	-	-	-	-	-	x	
29th	x	x	x	-	-	x	
31st	-	-	-	-	-	x	
33rd	x	x	x	-	-	x	
35th	-	-	-	-	-	x	
36th	x	x	x	-	-	-	

regular nutritional supplementation in the feeding center.

3) Smallpox and three DPT immunizations were given routinely prior to the 9th month. Polio, BCG and measles immunizations were provided during special campaigns. At various times, smallpox vaccinations were given by the FHW, the FPW, or the government vaccinator. DPT immunizations were first given by a team to get quick coverage of all the children and then the program was shifted to a maintenance routine as part of the responsibilities of the FHW.

d. Nutrition Services

1) At the time of the health check the dietary history of the child was determined and appropriate advice regarding feeding was given to the mother.

2) Early weaning was discouraged both in direct advice to the mother and in special group meetings organized as special educational sessions. After 4-6 months of age, supplementation of breast feeding was encouraged with appropriate locally adapted weaning foods in gradually increasing amounts.

3) Feeding centers were organized as part of child care services to provide supplementary feeding to children less than three who had been identified as faltering in growth. Such children were given food supplements in the feeding center twice a day. If they did not attend, a village attendant (VA) took the food to the home and supervised the feeding. Siblings who took responsibility for bringing younger children, were fed if they also wanted some of the supplement.

The supplement at first consisted of a drink of skimmed milk powder fortified with sugar and oil to increase its calories and/or a gruel of cracked

wheat, crude sugar, oil, and skimmed milk. During the last two years of the project combinations of corn-soya-wheat or corn-soya-milk were mixed with oil and crude sugar in the form of various traditional dishes to replace the gruel. All of these foods were quite well accepted by most children. Iron, folic acid, and vitamins were added routinely to the feedings.

e. Day Care Centers

During the harvest season day care centers were organized in some villages for children under three on an experimental basis. These lasted 4-6 weeks while the mothers from poorer families were working all day in the fields. The children were cared for and fed by village attendants under the supervision of the FHW.

f. Curative Care

The village FHW identified illnesses either during a home visit or when the child was brought to the clinic. Histories were elicited, examinations performed, and treatment was provided or referral recommended, according to very specific guidelines in worker manuals and standing orders. The latter were modified as FHWs demonstrated increasing ability to handle most of the medical problems which could be treated on an ambulatory basis. Children with serious illnesses or with symptoms clearly defined in standing orders were referred to the physician at the time of a weekly visit, or if necessary, the physician made an emergency house call to see the child in the village if the parent could not take the child to project headquarters. Hospitalization depended on the physician's recommendation and patients were sent either to the teaching health center of the CMC Medical College in Narangwal adjacent to the project headquarters, or if necessary, to the Medical College hospital in Ludhiana 20 miles away. This system was set up to replicate the government's regionalized pattern of care in subcenters, primary health centers, tehsil or district hospitals. As the project progressed it was discovered that more and more cases that would have originally been hospitalized were more adequately treated at home in the village. This was especially true for children with

third degree malnutrition who did not respond rapidly to supplementation. In the long run they did as well with village level nutrition services as with a period of intensive rehabilitation in the hospital.

Children's services were carefully integrated with other services provided in the villages. All women and children in the same family were treated simultaneously in the home or in the clinic. Family planning advice was given according to the entry points outlined in the following section. Careful planning, coordination and timing of all of these services was required to assure the most efficient use of precious home visiting time. Special reminder cards were developed for each family which showed when each visit was due and the appropriate activities.

The above reminder cards were an integral component of the family folder which included all records of women and children in each family. An index card for each child was filed separately to help locate the appropriate family folder. The folders included routine visit cards for the health check, the weight chart and patient : cards for curative services. Research data were collected on special morbidity, anthropometry, dietary survey and feeding center record forms. Index cards of children requiring special surveillance (such as malnourished children) were kept in a high priority file in order to assist in keeping track of them. At one point, special weight cards were also kept by the mother, but because of all the other records it was felt this produced unnecessary duplication since the chart on the clinic based record seemed to also provide an effective audio-visual device for educating the mother. Under non-research conditions, however, we would recommend that the family retained weight card should be used.

2. Women's Services

Many services provided to women in study villages were considered to affect both women and children as a unit. This overlap became apparent after we designated prenatal services as an integral component of children's services. There was also much overlap in the way curative

services were provided to women and children. However, certain unique aspects of women's services need to be emphasized.

First, for maternity care the FHW functioned through the indigenous midwife (dai) at the time of labor. She also involved the dai as much as possible during antenatal and postnatal care. This policy contrasted with the decision that all child care services should be provided by the FHW.

Second, emergency obstetrical cases often can be more rapidly disastrous and can immobilize the patient more completely than childhood emergencies. This gave rise to the need for somewhat different means of providing support for the FHW, including rapid access to well-equipped hospital services. Finally, many of the services to women involved a cyclical pattern of pregnant and non-pregnant states as compared with child care which was continuous and linear paralleling the development of the child.

As evolved at Narangwal, the components of the women's services included:

a. Fertility Surveillance

Each potentially fertile married woman was visited every two months to record the dates of her menses, detect early pregnancy and screen for symptoms of illness, especially gynecologic disorders. This visit was a central activity in scheduling home visits and maintaining the link between the FHW and village women.

b. Antenatal Care

When a pregnancy was identified at the time of a routine bimonthly visit, care was started with an antenatal check at that visit plus four more successive visits at home or in the clinic (approximately at 22, 34, 36 and 38 weeks of the pregnancy). The services included weight, height, blood pressure, abdominal examination, urine and hemoglobin. The latter two were done in the subcenter by the FHW. At the last visit the FHW and the dai went to the woman's home to make arrangements for the delivery. In addition, care was taken to predict and prepare for possible complications at the time of delivery. An important part

of antenatal care was the classification of women into four risk categories.

- I - Normal
- II - Abnormality in present pregnancy (twins, breech, etc.)
- III - Previous obstetrical complications
- IV - Unfavorable stature (below a specified height), age, or parity

Appropriate management of high-risk categories II, III and IV was decided by the physician.

Routine treatment during the pregnancy included medication for parasites, a series of two tetanus toxoid immunizations, iron, folic acid, and health and nutrition advice. Occasionally on the recommendation of the FHW or physician, pregnant women received nutritional supplementation.

b. Labor and Delivery

The families and the attending dai were instructed to notify the FHW at the onset of labor. The FHW was prepared to attend the labor and delivery if it did not appear to be progressing normally. She did not attempt to observe the process continuously but made repeat visits as required to monitor progress. A list of "danger signals" during labor was used by the FHW for appropriate management and to call for consultation and help. Physicians were provided with special emergency obstetrical kits for use in such emergencies. At the time of labor and delivery, and during antenatal and postnatal visits, the FHW consistently tried to improve the knowledge and skills of the dai. Emphasis was placed on teaching her the "danger signals" of labor and indications for referral. A more formal dai training program along with special procedures to incorporate the dai even more into the team structure were being developed at the time the project terminated.

d. Postpartum Care

In the immediate puerperium, and paralleling the neonatal visits at 24 hours, 2, 6, and 9 days postpartum, the mother's uterine involution, lochia, vital signs and lactation were checked. Follow-up visits were coordinated with child care on the second and sixth weeks,

and seventh and ninth months postpartum. Special attention was given on these visits to maintaining lactation.

e. Curative Services

Women of all ages were provided care for illnesses either in the subcenter clinic or at the time of home visiting, although the latter was discouraged unless the problem precluded mobility of the woman. As with child care, standing orders and guidelines were used by the FHW to elicit histories, examine the women, give appropriate treatment or refer cases to the physician. Hospitalization or referral to specialty clinics at the health center or hospital was provided when needed.

→ In both groups of villages receiving women's services, (FP WS CC and FPWS), the women's service component was identical.

A record system for women similar to that for child care included: index card, high priority file, reminder card, a routine visit card (Fertility Survey) and the patient record card. In addition, special records were used to record pertinent information from previous and current pregnancies, including antenatal visits, labor and delivery care and postnatal visits. These all were kept with the children's cards in the family folder.

3. Family Planning

Provision of family planning services in all the experimental villages of the project included education and motivation for the use of contraceptives to limit family size and to space children; provision of contraceptive services; and follow-up of users. At the beginning of the study family planning education and motivation were given in a "low key" manner. It was felt that previous adverse reactions by villagers to government family planning campaigns and the backlash to the

mass IUD campaign necessitated a cautious approach while developing rapport and understanding between the project staff and the villagers. Thus, we started by letting people know that contraceptives were available but they were provided without aggressive family planning education to those who requested them. After other services were well established FHWs were encouraged to discuss family planning with women on an individual basis during contacts for other services. It was left up to the FHW to sense intuitively appropriate times for such discussions. When a potential acceptor was identified, advantages and disadvantages of various methods were discussed, but no pressure tactics were used and there were no monetary or other incentives offered. No targets were set, but specific routines for follow up of acceptors were established. It was soon recognized that appropriate subjects and occasions to advise family planning were not easy for a young, frequently unmarried worker to recognize. Therefore, a specific effort was organized to formulate guidelines for the FHW to utilize her other service contacts more effectively for introducing family planning advice. These occasions when family planning had to be discussed with the women in the village were termed "entry points." In addition to the FHWs efforts, a male family planning worker was engaged in educational efforts among the men.

a. Systematic Family Planning

FHWs were trained to recognize and offer standardized advice on eight occasions ("entry points") during the women's care cycle. This later was expanded to a total of 14 entry points incorporating additional occasions related to care of children. Since many women's and children's services overlapped, these entry points also frequently coincided. On such occasions the FHW was expected to combine the appropriate entry point education.

(See Table 10.2 for the list of entry points.)

The frequency and content of the family planning advice depended on the women's reproductive history, family socioeconomic conditions, family health, and prior attitudes towards family planning. Especially important was the use of a family planning "profile" developed for each eligible woman which the FHW used to determine the intensity with which limitation or spacing of children should be encouraged. This profile

was based on the number of living children, sex of living children, elapsed time since the last pregnancy, spacing, occurrence of abortion or family planning failures, and health of the mother. At first the classification provided for "high," "medium," and "low" profile women. Those with a "high" profile received the most frequent and intense advice emphasizing limitation. The profile was subsequently modified near the end of the project to include only "high" and "low" profile categories. Specifically the final criteria of a "high" profile woman consisted of:

- presence of a chronic illness, or
- an induced abortion or family planning failure within the previous two years, or
- three or more living children with at least two sons and less than five years since termination of the last pregnancy, or
- less than three living children with less than two years since termination of the last pregnancy.

The FHWs rapidly learned to classify women appropriately but they were also encouraged to use their judgement to determine when advice could be given. A round "clock-like" dial device was developed to help the FHW remember when to give the appropriate advice. This was found helpful until the FHWs had used the entry points sufficiently to recognize them reflexively. In the final form, entry points were used by the experienced FHWs in a consistent manner, but with some flexibility permitting more frequent or less frequent advice depending on their judgement of need as well as the immediate home visiting situation. For example, if male members of the family were present at the time of an entry point, advice or discussion was often postponed until the next opportunity to see the woman alone.

b. Provision of contraceptives

The contraceptive methods made available to all potential acceptors included condoms, foam tablets, diaphragms and spermicidal cream, oral pills,* injectable Depo-Provera (provided by Upjohn Pharmaceutical Company), intrauterine contraceptive devices (the Lippes 27.5mm Loop and a shield shaped polyethylene device developed at Narangwal, the "Taviti"), sterilization of both males and females, and instruction in the rhythm method. Following the introduction of the liberalized abortion laws, assistance was provided to women seeking induced abortions. Because of Punjab regulations, both abortions and sterilizations were performed in accredited private or government hospitals to which the acceptors were referred. All the other methods were provided by resident field staff or at the time of the project physician's weekly visit to the subcenter.

Although all methods were discussed with potential acceptors, suggestions for the most appropriate methods were made by the worker after a screening history and examination. Recommendations for a method other than that chosen by the acceptor were made only if there were medical or social contraindications. For example, pills were not given during lactation, but Depo-Provera was used as an interim measure since it does not interfere with lactation. However, the Depo-Provera was not suggested for prolonged use unless the couple was relatively certain that they had completed their family. Sterilizations were not urged unless the couple had two living sons because of strong evidence that families desired a minimum of two sons.

Conventional contraceptives including condoms and foam tablets were dispensed by the FHW, FPE and FPW. Diaphragms were used very infrequently and were fitted by the physician. At first pills, injections, and IUDs were given only by the physician after examining the acceptor. In the final year of the project the FHWs were taught to dispense pills and insert IUDs after completing a check list and examination. If the latter were entirely negative, the FHW could procede on her own, while any

* Ovulen and a low dose oral contraceptive manufactured in India, Primovolar.

positive findings on the check list or in the exam required referral to the physician for evaluation. Although a similar pattern was judged feasible for injections, it was not carried out except on a few occasions. This was due to the feeling that more caution needed to be exercised with Depo-Provera as long as it was considered a drug still in the clinical testing stage.

c. Follow up of contraceptive users

Follow ups were carried out by FHWs in clinic and home. Encouragement and support were stressed as important components of follow up. Schedules for follow up visits varied as follows:

1) Conventional contraceptives: Enquiries were made at each home visit associated with the Fertility Survey (bimonthly). Supplies were dispensed at that time by the FHW. Alternatively the male FPW distributed supplies (condoms) on his routinely scheduled visits.

2) Oral pills: Users of oral contraceptives were visited at monthly intervals for three months and thereafter every two months at the time of the Fertility Survey. Supplies sufficient until the next visit were provided and careful enquiries were made related to the manner of taking the pills, any menstrual abnormalities, or other possible side effects. The FHW checked the supplies to verify that the pills had been taken before providing subsequent cycles.

3) Depo-Provera: Monthly follow up visits were carried out for three months and then every three months at the time repeat injections were due. Examinations and enquiry were similar to those for pill users. The weight and blood pressure of the women was also checked. Because of frequent prolonged amenorrhea associated with Depo-Provera, oral estrogen therapy was provided 10 days each month to induce withdrawal bleeding.

4) IUD: Acceptors were checked one week post-insertion, and then at one and three months after insertion. Thereafter the follow up was coordinated every four months with the Fertility Survey. At each visit an enquiry was made whether the patient could still feel the threads of the IUD and whether she had any symptoms such as cramping

and bleeding. If there was any question about the IUD being in place, the FHW or the physician checked it by means of a pelvic exam.

5) Sterilization: Following vasectomies the man was visited by the FPW to ascertain whether any complications had developed and to make sure the man understood the need to continue another family planning method until his semen was checked and found negative for sperm. When tubectomy cases returned to the village frequent visits were made by the FHW to check the wound and change the dressing as needed until the incision was healed.

d. The Male Family Planning Worker

The combination of family planning with women's and children's services produced a family planning program centered on women. It was felt that, unlike health services which men could seek elsewhere, family planning contacts with men were essential to provide adequate coverage of both members of the couple. This was especially true since the husbands were generally considered decision makers in regard to family planning. To provide special coverage for men, a male family planning worker (FPW) was used to supplement the activities of three or four female FHWs. The FPW made routine visits to all husbands in study villages, to motivate them to use contraceptives, to supply condoms to acceptors, and to follow up users. An important aspect of the FPW's village visits was to discuss problem cases with the FHW and to coordinate the motivation of both husband and wife in resistant cases. The work load of the FPW was organized so that he could spend full time on family planning. On occasion, however, he assisted the FHW in providing smallpox vaccinations and other immunizations.

e. The Family Planning Education Villages

The provision of family planning services in these villages was similar to that in other study villages with respect to actual delivery of contraceptives and the follow up of users. These two activities, however, were carried out primarily by one family health supervisor (FHS) who served all four villages, and by one physician who was available for supervision, referral, and consultation.

The major difference in the Family Planning Education villages was that home visiting was limited to family planning education, group education meetings were organized and no health services were provided. The basic village-level workers were called family planning educators (FPE) and were junior basis teachers (JBT), a category of village teachers with essentially the same total amount of educational preparation as ANMs. This precluded any chance that health care might be delivered under pressure of the villagers. In order to provide structure to the home visits, a sequence of discussion topics was developed to be used by these FPEs in routine visits to each eligible woman, approximately once a month. When an acceptor was identified she was referred to the FHS or physician for contraceptives. In order to supplement home contacts, group meetings of women were organized to discuss various aspects of family planning. These proved quite useful and before the close of the project similar meetings were being organized in all the study villages according to the pattern developed in the FPEd villages.

f. Family Planning Records

In villages with women's services all family planning visits were recorded on the women's patient record. If advice was given at the time of a specific entry point, a special notation was made in the space provided on the form. In the FPCC and FPEd villages a special family planning record was utilized because the services were separated. In addition, the FPHs and FPEs kept separate records for each of the men or women visited. Lists of all acceptors as well as a special index file of all users was maintained to ensure adequate follow up.

4. Staffing of the Service Programs

The basic staffing pattern of the Narangwal services consisted of a female family health worker (FHW) assigned to each village subcenter; one male family planning worker (FPW) for every three or four FHWs; and one family health supervisor (FHS) for every three or four FHWs. In addition, public health nurses (PHNs) provided overall supervision of the female field workers, one PHN generally being responsible for eight or more village subcenters while services were originally being

developed. Physicians participated in the coordination and supervision of services and provided service back-up to FHWs by weekly visits to each subcenter as well as by being available for emergencies. Supervision of the FPWs was provided by a male social scientist. Each subcenter served one village with an average population of 1300 to 1500.

Modifications to the above pattern were made in various experimental groups and included the following:

- a. In the FPWS villages four subcenters were served by three FHWs, one FHW covering two smaller villages.
- b. The FPCC villages were also part of a nutrition and infection study and therefore had five FHWs in the three villages, because a major part of their responsibility included a detailed morbidity survey. There was, however, no FHS since the additional research effort required that these FHWs have training equivalent to the FHSs in other villages. A PHN provided direct supervision to the FHWs in these villages. In May 1973, field work on the nutrition project was completed and thereafter one FHW served each village. In addition, in the first two years of family planning services in the FPCC villages one full-time and one half-time FPW provided services to the men. This was reduced to one FPW in 1973 to come into line with the other experimental groups.
- c. For approximately one year in 1972-73 only one FHS was available to cover both FP WS CC and FP WS villages. During this time she supervised all seven FHWs. Although this restricted her involvement in research activities, it provided an opportunity to observe the feasibility of greater service coverage by the FHS and the coverage seemed adequate.
- d. In 1973 one of the more experienced FPWs was given responsibility for additional group education in all study villages. This consisted of helping the other FPWs organize group meetings and

film shows.

e. The FPEd villages had staffing ratios similar to other villages except that FPEs replaced PHNs. In addition, there was one FHS for the four villages to provide contraceptive services but she was not the FPEs supervisor. Instead, the FPEs were supervised by a female supervisor with a social science background who was the equivalent of the FHS or PHN in the other cells. Finally, although the physician provided back-up contraceptive service and participated in group meetings, the overall supervision of the activities of the cell was provided by a social scientist. In comparison to the other cells, this replaced a similar level of supervisory input supplied by PHNs and physicians.

f. The staffing pattern for PHNs and physicians varied depending on the numbers available and the intensity of their involvement in research activities. It was greatest at the beginning when the services were first being developed and was decreased as the efforts were standardized. The ratio of physicians and PHNs to subcenters varied from 1:4 to 1:8. Most important was a frequent lack of lady physicians to supervise both child care and family planning activities. The FPWSCC, FPWS and FPEd villages had the most consistent availability of lady physicians. During the last year only one lady physician was available and she had to selectively divide her time among all groups of villages. As a result, on several occasions male physicians provided all services except gynecology and family planning. In the FP-CC villages especially this dual type of coverage by a male physician for child care and a female physician for family planning proved necessary for most of the study time and this made integration of services difficult. Another variation was that a PHN with special training in family planning served as a physician substitute during the last year of the project. At one time or another she backed up family planning services in all villages of the project.

g. An important requirement for all three types of peripheral workers (PHNs, FPEs, and FPWs) was the availability of "relievers."

These were reserve workers of the same category who filled in for the regular worker when she or he was on leave. This provided a continuity of field work which was considered essential for research data collection, as well as for making the services more consistent and more credible to villagers. Such a system should be considered mainly for large blocks of leave (e.g., maternity leave) when manpower is limited in the government setting.

h. Finally, in each village with children's services (FPWSCC and FPCC) two local women were hired full time to assist the FHW in the feeding centers and home follow up. These village attendants (VA) were directly supervised by the FHW.

5. Background, Selection, and Role of Different Staff Categories

All service staff were essentially similar to comparable levels of workers in government health services with a few modifications to permit flexibility in the research situation of Narangwal. The basic characteristics of the different categories of service staff were as follows:

a. Family Health Worker (FHW)

Two types of health workers were recruited for this position. In the FPWSCC and FPWS villages they had received standard government prescribed training as an auxiliary nurse midwife (ANM). This consisted of two years of hospital and field training following 8 to 10 years of basic education. The emphasis was mainly on hospital midwifery. In the FPCC villages the FHW was a lady health visitor (LHV), which meant that she had received 2½ years of training beyond 10th grade in a special program involving both hospital and field training. The field and public health aspects of the LHV training were more intensive than that of the ANM. The FPCC group of villages was part of the parallel nutrition project where

data gathering requirements of the morbidity survey were particularly demanding. Therefore, the slightly greater academic qualifications of

the LHV were considered necessary.

All FHW;s were recruited through newspaper advertisements and selected by means of an interview and the results of a non-verbal intelligence test (Raven's Matrix Test). Final selection was based on their performance during the training period. Reading and writing ability in English was required because of the research component of the project; however, ability to converse in English was not essential. As a result of project experience we learned that FHWs with little previous experience were more receptive to retraining in new service patterns than individuals who had long experience in government health centers. The role of the FHWs was to be the primary health worker in each village providing both home and clinic services as required by the project design. She also referred cases as needed to the FHS, PHN, and physician.

b. Family Planning Educator (FPE)

This worker's background was as closely matched as possible to the ANM, except that the training was in a non-health field. Females of similar age and general education with two years' training as junior basic teachers (JBTs) were selected in a manner similar to FHWs and retrained for their new roles. The FPE's command of written English was often not as adequate as the FHW's (due to differences in their previous medium of instruction) so that all FPE records were recorded in Punjabi or Hindi. The role of the FPE was to be the primary family planning motivator at the village level, to provide education in family planning, to offer some specific contraceptive and follow up services and to refer cases to the FHS and physician.

c. Family Planning Worker (FPW)

Men with either a high school or undergraduate college degree were selected as FPWs. No formal health training or experience was required. Selection was based on similar criteria as for the FHW except emphasis was placed on apparent maturity and probable ability to relate and communicate with village men. The role of the FPW was to develop good relationships with the men of the study villages in

order to educate them about family planning and motivate them to use contraceptives when appropriate. They also provided condom supplies and followed up husbands of all contracepting couples.

d. Family Health Supervisor (FHS)

The supervisors of FHWs (the ANM type) had been trained as LHWs. This is the pattern in the Punjab government services. In selection they were chosen either from among the FHWs in the nutrition study villages or less often directly as FHSs. Special leadership qualities were looked for in the potential FHS since her main role was to support and supervise the FHWs. In difficult or emergency situations she occasionally provided direct services to women and children. After FHWs were trained to screen potential contraceptive users, dispense oral pills and insert IUDs, the FHS was generally the first to institute these delegated activities in each group of villages. In the FP-Ed. villages the FHS functioned more on the level of an FHW in providing contraceptive services directly. However, because of her greater experience, she was also frequently used to assist the FPS and social scientist in supervising the FPEs and in group education.

e. Public Health Nurse (PHN)

The public health nurses recruited for Warangval had major responsibilities for development of services and supervision of major parts of the data collection (e.g., morbidity, anthropometry, and fertility surveys by the FHWs). Their background varied from diplomas in public health, to bachelor's and master's degrees in addition to standard nurses training. The PHNs played a critical role in designing the innovative reorganization of services and in the establishment of supervisory patterns, record systems, writing of manuals and standing orders and in training. Because of the developmental nature of the services it is not surprising that they also assumed major responsibility for much of the actual supervision of the female field workers. As the project progressed, this responsibility was passed to the FHS at the field level. PHNs very rarely stepped in to provide actual services, leaving this up to the established FHW - physician

referral system. As mentioned earlier, the only major exception was the utilization of one PHN to provide family planning as a substitute for a lady physician.

f. Family Planning Supervisor (FPS)

The direct supervisor of the FPEs had a master's degree in education. As in the case of the PHN, it was felt that a relatively well-qualified individual was needed during the developmental stages of the FPE service pattern. The FPS besides providing the basic field supervision of the FPEs, participated in training programs and often conducted village group meetings.

g. Social Scientists

Although selected entirely on the basis of potential contributions to the research aspects of the Narangval studies, social scientists were also designated to provide field supervision of FPWs and to assume overall responsibility for the FP-Ed. villages. Those involved had backgrounds in sociology or social work at the master's or Ph.D. level. The justification for using individuals with a high level of training was because of the experimental and developmental nature of the work. The social scientists organized the FPW activities and most of the FPED . program and then were responsible for the continuing modification of these services. Actual supervision of FPWs was limited to only a fraction of a social scientist's time, while overall direction of the FPED . villages required approximately half-time for one social scientist.

h. Physicians

A wide variety of background and experience characterized the physicians of the project. They ranged from individuals with no specialty training but with many years of field experience in primary health centers and government family planning programs, to physicians with specialty training in pediatrics, obstetrics-gynecology, and public health. Generally those with extensive special training served as project officers and were infrequently involved in actual delivery of services. They assumed the overall role of directing and developing

both service and research components of the project in the field. The other physicians were deeply involved in research and development also, but their primary role included provision of referral services to FHWs and FPEs, as well as coordinating field supervision with FHSs and PHNs. Finally, all physicians participated actively in the training programs and development of manuals, and standing orders.

i. Village Attendants

The village attendant was generally an illiterate woman selected from the study village who needed employment. Ages varied from teenagers to older women past the reproductive age. Some happened also to be dais. Their main role was maintaining the feeding center, preparing food supplements, supervising the feeding in the center, feeding non-attenders at home, and assisting the FHW in weighing and maintaining records of malnourished children. In addition, as needed, they assisted the FHW in other activities such as calling referral cases to the clinic, rounding up children for routine weighing or immunizations and as a direct channel of communication to the village women.

j. Others

Other workers relating fairly directly to service programs were:

1) Laboratory technicians provided simple clinical laboratory tests such as stool exams, blood smears for RBC morphology and malaria parasites, white blood counts, urine sediment exams, and sputum smears. These technicians also performed special laboratory tests for research substudies and prepared medicines for use in the villages.

2) A nutritionist was employed for the research aspects of the nutrition project. She also assisted in developing and supervising the feeding centers. Especially important was her role in evolving the varied food supplements used as weaning foods from the basic staples that were available.

6. Other Program Components

a. Facilities

In each study village one of the first activities after its selection was the renovation of a village building or house to become a subcenter clinic and headquarters for the village services. Generally an existing or new building was donated by the village or an individual for renovation. The renovation of the older structures included adding cement floors, screens, a latrine and a driven hand pump for water supply. The space was divided, when possible, into two rooms, one for consultation and the other for examinations, IUD insertions, etc. Attempts were made to ensure that each clinic was reasonably accessible to all village families and did not antagonize any one faction by its location.

The subcenters were sparsely equipped with the minimum essential furniture and equipment, much of it made by project carpenters. These included a simple desk, chairs, storage cabinets, wooden examining tables, and filing cabinets for records. Purchased equipment included scales, kerosene stoves, trays and instruments.

In villages providing nutrition services an additional room or a room in one or more separate buildings was used for a feeding center. Location was planned to give easy access to poor and high risk families. A stove, utensils and food storage bins were all that were required as equipment, apart from rugs or mats for the children to sit on.

The workers' village residence was a major concern. Space was usually rented from a respected family and one or two rooms were provided with improvements such as cement floors and screening. A bath and a kitchen always had to be built for the worker.

The Narangwal headquarters was in converted village buildings which provided research and administrative offices. A large training room was used for staff education and a small but comprehensive library was available. A consultation-examining room was maintained for cases referred from the villages to the project physicians. Emergencies that could not be handled at the project headquarters on an ambulatory

basis were referred to the nearby teaching health center or to the medical college hospital in Indhiana.

b. Supplies

Each fortnight when the field workers were brought by project vehicles to the headquarters for training sessions they utilized the opportunity to replenish their subcenter supplies. Alternatively, requests were forwarded through supervisors and supplies were sent in the vehicles at the time of field visits.

A set formulary was established for drugs used both by FHWs and physicians. Supplies for physicians' use were kept separately in each village, and each of them carried a complete medical box of special supplies on field visits. The formularies were frequently reviewed to ensure that they were limited to essential drugs that were really used. Almost all drugs were purchased from supply houses in India, except for special items such as Depo-Provera and measles vaccine.

Food supplies were obtained from relief agencies, although crude sugar and oil were purchased.

c. Transportation

Family health workers, FPEs, FPWs and FHSs all used bicycles for transportation within and between villages. Ability to ride a bicycle was a positive consideration although not essential in the selection of new workers. However, if they did not already ride bicycles they had to learn after joining the project. The bicycle was especially important to the FHWs and FHSs who had to cover more than one village. PHNs and physicians used project vehicles including motorcycles and scooters to travel to the villages. Vehicles, mostly four-wheel drive, also were used to bring field workers to training sessions at the Narangwal headquarters.

